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THE  
AMERICAN EPHEMERIS

AND  
NAUTICAL ALMANAC,

FOR THE YEAR  
  
1879.

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PUBLISHED BY AUTHORITY OF THE SECRETARY OF THE NAVY.

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SECOND EDITION.

BUREAU OF NAVIGATION:  
WASHINGTON.  
1878.





# CORRECTIONS.

## EPHEMERIDES FOR 1874—1878.

**SATURN'S RING.**—The values of  $\alpha$  in the table should be subtracted from  $360^\circ$ , and  $\omega'$  obtained by subtracting  $42^\circ 54' 8'' - 1'.50$  ( $t - 1875$ ) from the corrected values of  $\alpha$ .

## EPHEMERIS FOR 1876.

Page 128, Aug. 31, Equation of Time,	for	1 <sup>m</sup> .22	read	1 <sup>m</sup> .42
325, March 20, " "	"	23 <sup>m</sup> .28	"	23 <sup>m</sup> .20
409, . . . . For Shadow,	"	A. B.	"	B. C.

## EPHEMERIS FOR 1877. 1st Edition.

Page 472, Phases of Venus should be—

May 31, .993	Aug. 29, .897	Nov. 27, .568
June 30, .966	Sept. 28, .779	Dec. 27, .411
July 30, .915	Oct. 28, .683	

## EPHEMERIS FOR 1878. 1st Edition.

## EPHEMERIS FOR 1879, (first and second editions.)

Preface and Contents,	for AUWER'S	read AUWERS'S
Page 258, seventh line,	for $-0''.0457 \sin$	read $-0''.0463 \sin$
262, right ascension of $\omega$ Piscium, $23^h 53^m$ ,	for $65^\circ 910$	read $5^\circ 910$
334, right ascension of $d^2$ Cancr, $8^h 18^m$ ,	for $55^\circ 96$	read $58^\circ 82$
334, right ascension of $\pi$ Leonis, $9^h 53^m$ ,	for $48^\circ 60$	read $49^\circ 10$
334, right ascension of $d$ Leonis, $10^h 54^m$ ,	for $18^\circ 62$	read $18^\circ 72$
336, declination of 3 Piscium, $22^h 54^m$ ,	for $1'' 0$	read $47'' 8$
336, right ascension of $\omega$ Piscium, $23^h 53^m$ ,	for $6^\circ 91$	read $5^\circ 91$
341, line seventeen from bottom,	for page 250	read page 248
407, last line,	for $19380 \pm 60$	read $19380 \pm 70$
455, May 27, $8^h 21^m$ ,	for $19^\circ 3$	read $23^\circ 7$
455, May 27, $12^h 55^m$ ,	for $41^\circ 3$	read $36^\circ 9$
467, middle of page,	dele Such a table is given in the Appendix.	

## APPENDIX.

8, column "For Seconds,"	for 16 16 18	read 16 17 18
8, reduction for $6^h 30^m$ ,	for $1^m 3^\circ 802$	read $1^m 3^\circ 892$
9, reduction for $11^h 38^m$ ,	for $1^m 54^\circ 531$	read $1^m 54^\circ 351$
10, reduction for $16^h 58^m$ ,	for $2^m 46^\circ 755$	read $2^m 46^\circ 775$

## SUPPLEMENT.

(4), (5), (6), Table C, $88^\circ 40' 10''$ ,	for $-0''.2 + 0''.2$	read $0'' 2 - 0''.2$
(8), Table C, column B,	for $1'' 0$	read $1' 0''$
(9), headings of columns,	for $88^\circ 40' 88^\circ 41'$	read $88^\circ 30' 88^\circ 40'$
(10), $A=56'$ , declination $=88^\circ 41' 0''$ ,	for $41'' 0$	read $42'' 0$



# CORRECTIONS.

## EPHEMERIDES FOR 1874—1878.

**SATURN'S RING.**—The values of  $u$  in the table should be subtracted from  $360^\circ$ , and  $u'$  obtained by subtracting  $42^\circ 54'.8 - 1'.50$  ( $t - 1875$ ) from the corrected values of  $u$ .

## EPHEMERIS FOR 1876.

Page 128,	Aug. 31,	Equation of Time,	for	1 <sup>h</sup> 22	read	1 <sup>h</sup> 42
325,	March 20,	" "	"	23 <sup>m</sup> 28	"	23 <sup>m</sup> 20
409,	. . . .	For Shadow,	"	A. B.	"	B. C.

## EPHEMERIS FOR 1877. 1st Edition.

Page 472,	Phases of Venus should be—					
	May 31, .993	Aug. 29, .897	Nov. 27, .568			
	June 30, .966	Sept. 28, .779	Dec. 27, .411			
	July 30, .915	Oct. 28, .683				

## EPHEMERIS FOR 1878. 1st Edition.

Page 248,	May 30,	Long. of Moon's $\Omega$	for	42'	read	43'
257,	Dec. 31 and 32,	$\tau$	"	0'	"	1'
261,	$\alpha$ Serpentis,	Var. of R. A.	"	3'	"	2'
288,	$\beta$ Geminorum,	Dec.	"	18'	"	19'
294,	Dec. 34.7,	$\nu$ Leonis, Diff. for Dec.	"	+ 2.2	"	- 2.2
296,	Dec. 34.7,	$\beta$ Corvi, R. A.	"	63'	"	62'
333,	58 Piscium,		"	39 <sup>m</sup>	"	40 <sup>m</sup>
416,	Jan. 16,	B. A. C. 1882, $\Delta\alpha$	"	2 <sup>h</sup> 55	"	2 <sup>h</sup> 35
417,	Feb. 4,	11 Piscium, $\Delta\delta$	"	1 <sup>h</sup> 7	"	1 <sup>h</sup> 1
418,	" 14,	$\mu^1$ Cancrī, $\Delta\alpha$	"	2 <sup>h</sup> 46	"	2 <sup>h</sup> 66
419,	" 19,	28 Virginis, $\Delta\delta$	"	19 <sup>h</sup> 2	"	14 <sup>h</sup> 2
422,	March 25,	B. A. C. 6592,	"		"	6562
424,	April 11,	B. A. C. 2925, $\Delta\alpha$	"	1'	"	2'
424,	" 12,	$\psi$ Leonis, $\Delta\alpha$	"	0'	"	2'
426,	" 25,	42 Capricorni,	"	1 <sup>h</sup> 83	"	1 <sup>h</sup> 43
432,	July 5,		"	$\nu$ Leonis,	"	$\nu$ Leonis.
434,	" 25,	B. A. C. 1648, $\Delta\alpha$	"	9'	"	7'
434,	Aug. 1-5,	$\Delta\alpha$	"	+	"	—
435,	" 5,	42 Libræ, $\Delta\alpha$	"	2'	"	3'
440,	Sept. 23,	B. A. C. 3345, $\Delta\delta$	"	7 <sup>h</sup> 5	"	6 <sup>h</sup> 9
441,	Oct. 13,	$g$ Pleiadum, $\Delta\delta$	"	20 <sup>h</sup> 7	"	20 <sup>h</sup> 1
448,	Dec. 25,		"	$\nu$ Capricorni.	"	$\nu$ Capricorni.
477,	Königsberg,	Long. in Arc,	"	0 <sup>h</sup> 2	"	2 <sup>h</sup> 0
(This correction is to be made to the Ephemerides for 1875-'6-'7.)						
484,	28th line,	Declination,	for	N.	read	S.
488,	10th line from the bottom,					<sup>b</sup> Jan. 12, 5 34.79
Appendix,	Page 9,	14 <sup>h</sup> 16 <sup>m</sup>	"	20 <sup>h</sup> 225	"	20 <sup>h</sup> 235
Supplement,	Page 3,	1 <sup>h</sup> 6 <sup>m</sup>	"	19'	"	16'
	5,	3 <sup>h</sup> 50 <sup>m</sup> , Alt. 29°,	"	20 <sup>h</sup> 0	"	2 <sup>h</sup> 0.0
	6,	3 <sup>h</sup> 30 <sup>m</sup> , " 37°,	"	26 <sup>h</sup> 8	"	26 <sup>h</sup> 5
	6,	3 <sup>h</sup> 40 <sup>m</sup> , " 39°,	"	26 <sup>h</sup> 4	"	30 <sup>h</sup> 4



# CHRONOLOGICAL ERAS AND CYCLES.

## CHRONOLOGICAL ERAS.

THE YEAR 1879, WHICH COMPRISES THE LATTER PART OF THE 103D AND THE BEGINNING OF THE 104TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6592 of the Julian period;

“ 7387–88 of the Byzantine era;

“ 5639–40 of the Jewish era;

“ 2632 since the foundation of Rome, according to Varro;

“ 2626 since the beginning of the era of Nabonassar, which has been assigned to Wednesday, the 26th of February, of the 3967th year of the Julian Period, corresponding according to the chronologists to the 747th, and according to the astronomers to the 746th year before the birth of Christ.

“ 2655 of the Olympiads, or the third year of the 664th Olympiad, commencing in July, 1879, if we fix the era of the Olympiads at 775½ years before Christ, or near the beginning of July of the year 3938 of the Julian Period;

“ 2191 of the Grecian era, or the era of the Seleucidæ;

“ 1595 of the Era of Diocletian.

The year 1297 of the Mohammedan era, or the era of the Hegira, begins on the 15th of December, 1879.

The first day of January of the year 1879 is the 2,407,351st day since the commencement of the Julian Period.

## CHRONOLOGICAL CYCLES.

Dominical Letter, . . . . .	E	Solar Cycle, . . . . .	12
Epact, . . . . .	7	Roman Indiction, . . . . .	7
Lunar Cycle or Golden Number, . .	18	Julian Period, . . . . .	6592

## SYMBOLS AND ABBREVIATIONS.

### SIGNS OF THE PLANETS, &c.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
♁ or ♂	The Earth.	♆	Neptune.

### SIGNS OF THE ZODIAC.

Spring signs.	{	1.	♈	Aries.	Autumn signs.	{	7.	♎	Libra.
		2.	♉	Taurus.			8.	♏	Scorpio.
		3.	♊	Gemini.			9.	♐	Sagittarius
Summer signs.	{	4.	♋	Cancer.	Winter signs.	{	10.	♑	Capricornus.
		5.	♌	Leo.			11.	♒	Aquarius.
		6.	♍	Virgo.			12.	♓	Pisces.

### ASPECTS.

♌	Conjunction, or having the same Longitude or Right Ascension			
☐	Quadrature, or differing 90° in	"	"	"
♌	Opposition, or differing 180° in	"	"	"

### ABBREVIATIONS.

♊	Ascending Node.	°	Degrees.
♋	Descending Node.	'	Minutes of Arc.
N.	North.	"	Seconds of Arc.
S.	South.	h	Hours.
E.	East.	m	Minutes of Time.
W.	West.	s	Seconds of Time.

## PREFACE.

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The preparation of the *American Ephemeris and Nautical Almanac* was begun in the latter part of the year 1849, in accordance with an act of Congress, approved on the 3d of March of that year. An account of this preparation and the values of the constants adopted will be found in the preface and appendix of the first volume, that for the year 1855.

The changes introduced in the volumes for 1865 and 1869 are described in the prefaces of the volumes for those and subsequent years.

HANSEN and OLUFSEN's tables of the Sun were first used in the preparation of the volume for 1858; NEWCOMB's tables of Neptune in that for 1870; and HILL's tables of Venus and NEWCOMB's tables of Uranus in that for 1876.

The appendix to this volume contains the reduction of places of fundamental stars to NEWCOMB's right ascensions and AUWER's declinations.

A supplement contains tables for finding the latitude of a place by altitudes of the pole-star.

J. H. C. COFFIN,

*Prof. Math. U. S. Navy, Superintendent.*

WASHINGTON, April, 1876.



# CONTENTS.

Chronological Eras and Cycles . . . . .	Page v
Symbols and Abbreviations . . . . .	vi
<b>EPHEMERIS FOR THE MERIDIAN OF GREENWICH.</b>	
Ephemeris of the Sun . . . . .	Pages of each Month 1-III
Ephemeris of the Moon . . . . .	IV-XII
Lunar Distances . . . . .	XIII-XVIII
Ephemerides of the planets, Venus, Mars, Jupiter, Saturn . . . . .	Page 218
Moon's Longitude and Latitude . . . . .	242
<b>EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.</b>	
Obliquity of the Ecliptic, &c. . . . .	248
Fixed Stars:	
Logarithms of <i>A</i> , <i>B</i> , <i>C</i> , <i>D</i> , for reducing the Places of Fixed Stars . . . . .	249
<i>f</i> , <i>G</i> , <i>H</i> , &c.,                   "                   "                   "                   "                   " . . . . .	252
Bessel's Formulæ of Reduction . . . . .	258
Mean Places for 1879.0 . . . . .	259
Apparent Places of four Circumpolar Stars . . . . .	263
Apparent Places of other fundamental Stars . . . . .	275
Ephemeris of the Sun . . . . .	324
Moon-Culminations . . . . .	330
Moon-Culminating Stars . . . . .	333
Moon's Semidiameter and Horizontal Parallax . . . . .	337
Moon's Phases, Apogee, Perigee, and Greatest Libration . . . . .	341
Moon's Equator . . . . .	342
Table for the Libration of the Moon . . . . .	343
Ephemerides of the Planets, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune . . . . .	344
Horizontal Parallaxes and Semidiameters of the Planets . . . . .	386
Sun's Coördinates . . . . .	388
Heliocentric Coördinates of the Planets . . . . .	400
Inclinations, Nodes and Masses of the Planets . . . . .	407
Eclipses . . . . .	408
Occultations, Elements for the prediction of . . . . .	415
"                   visible at Washington . . . . .	449
Jupiter's Satellites . . . . .	452
Saturn's Ring, Discs of Venus and Mars . . . . .	474
Phenomena, Planetary Constellations . . . . .	475
Latitudes and Longitudes of Observatories . . . . .	477
The Arrangement and Use of the Tables . . . . .	479
<b>APPENDIX.</b>	
Construction of the Ephemerides . . . . .	3
Table I. Corrections of Lunar Distances for second difference in Moon's motion . . . . .	7
II. For converting Sidereal to Mean Time . . . . .	8
III. For converting Mean to Sidereal Time . . . . .	11
IV. Corrections of <i>A</i> and <i>B</i> for terms depending on $2\zeta$ and $\zeta - \Gamma'$ . . . . .	14
V. Corrections of <i>A</i> and <i>B</i> , in 1879, for other small terms of nutation . . . . .	15
VI., VII. For finding corrections of R. Ascension and Declination for terms depending on $2\zeta$ and $\zeta - \Gamma'$ . . . . .	16, 17
VIII. Reduction of places of fundamental stars to those of Newcomb's and Auwer's . . . . .	18
<b>SUPPLEMENT.</b>	
Tables for finding the latitude of a place by altitudes of the pole-star . . . . .	(1)

**ASTRONOMICAL EPHEMERIS**

**FOR THE USE OF**

**NAVIGATORS.**

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Wed.	1	18 46 49.53	11.043	S. 23 1 10.7	+12.34	16 18.40	71.09	3 45.27	1.183
Thur.	2	18 51 14.38	11.027	22 56 0.4	13.49	16 18.40	71.05	4 13.48	1.168
Frid.	3	18 55 38.86	11.011	22 50 22.8	14.63	16 18.40	71.00	4 41.32	1.151
Sat.	4	19 0 2.93	10.993	22 44 18.1	15.76	16 18.40	70.94	5 8.76	1.134
Sun.	5	19 4 26.57	10.975	22 37 46.3	16.88	16 18.38	70.88	5 35.76	1.115
Mon.	6	19 8 49.76	10.956	22 30 47.6	18.00	16 18.36	70.82	6 2.31	1.096
Tues.	7	19 13 12.46	10.935	22 23 22.4	19.10	16 18.34	70.76	6 28.38	1.076
Wed.	8	19 17 34.66	10.914	22 15 30.8	20.20	16 18.31	70.69	6 53.96	1.055
Thur.	9	19 21 56.36	10.892	22 7 12.9	21.28	16 18.27	70.62	7 19.03	1.033
Frid.	10	19 26 17.50	10.869	21 58 29.0	22.36	16 18.22	70.54	7 43.55	1.010
Sat.	11	19 30 38.08	10.845	21 49 19.4	23.42	16 18.17	70.46	8 7.50	0.986
Sun.	12	19 34 58.07	10.820	21 39 44.4	24.48	16 18.12	70.38	8 30.88	0.961
Mon.	13	19 39 17.47	10.795	21 29 44.2	25.52	16 18.06	70.30	8 53.65	0.936
Tues.	14	19 43 36.24	10.769	21 19 19.0	26.56	16 17.99	70.21	9 15.81	0.910
Wed.	15	19 47 54.38	10.742	21 8 29.2	27.58	16 17.92	70.12	9 37.33	0.883
Thur.	16	19 52 11.87	10.714	20 57 15.0	28.59	16 17.84	70.02	9 58.21	0.856
Frid.	17	19 56 28.68	10.685	20 45 36.6	29.59	16 17.76	69.92	10 18.41	0.827
Sat.	18	20 0 44.78	10.656	20 33 34.4	30.57	16 17.67	69.82	10 37.90	0.798
Sun.	19	20 4 60.17	10.626	20 21 9.0	31.54	16 17.58	69.72	10 56.68	0.769
Mon.	20	20 9 14.84	10.595	20 8 20.4	32.49	16 17.48	69.61	11 14.74	0.738
Tues.	21	20 13 28.75	10.564	19 55 9.1	33.43	16 17.38	69.51	11 32.05	0.706
Wed.	22	20 17 41.90	10.532	19 41 35.7	34.35	16 17.28	69.40	11 48.59	0.674
Thur.	23	20 21 54.27	10.499	19 27 40.4	35.26	16 17.18	69.29	12 4.37	0.641
Frid.	24	20 26 5.85	10.466	19 13 23.3	36.15	16 17.07	69.18	12 19.36	0.608
Sat.	25	20 30 16.64	10.431	18 58 45.0	37.02	16 16.96	69.07	12 33.55	0.575
Sun.	26	20 34 26.61	10.397	18 43 46.1	37.88	16 16.84	68.96	12 46.93	0.541
Mon.	27	20 38 35.76	10.363	18 28 26.8	38.72	16 16.72	68.85	12 59.50	0.506
Tues.	28	20 22 44.08	10.328	18 12 47.6	39.54	16 16.60	68.74	13 11.22	0.471
Wed.	29	20 46 51.55	10.294	17 56 48.9	40.34	16 16.47	68.63	13 22.10	0.436
Thur.	30	20 50 58.18	10.259	17 40 30.9	41.13	16 16.34	68.51	13 32.14	0.400
Frid.	31	20 55 3.97	10.223	17 23 54.3	41.90	16 16.20	68.40	13 41.35	0.365
Sat.	32	20 59 8.92	10.188	S. 17 6 59.4	+42.66	16 16.06	68.28	13 49.72	0.331

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.19 from the Sideral Time.

+ prefixed to the hourly change of declination indicates that south declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Wed.	1	<sup>h</sup> 18 <sup>m</sup> 46 <sup>s</sup> 48.83	<sup>s</sup> 11.039	S. 23° 1' 11.5"	+12.33	<sup>m</sup> 3 <sup>s</sup> 45.19	<sup>s</sup> 1.183	<sup>h</sup> 18 <sup>m</sup> 43 <sup>s</sup> 3.64
Thur.	2	18 51 13.59	11.024	22 56 1.4	13.48	4 13.39	1.168	18 47 0.20
Frid.	3	18 55 37.98	11.008	22 50 24.0	14.62	4 41.22	1.151	18 50 56.76
Sat.	4	19 0 1.97	10.990	22 44 19.5	15.75	5 8.66	1.134	18 54 53.31
Sun.	5	19 4 25.53	10.972	22 37 47.9	16.87	5 35.66	1.115	18 58 49.87
Mon.	6	19 8 48.64	10.953	22 30 49.5	17.99	6 2.21	1.096	19 2 46.43
Tues.	7	19 13 11.26	10.932	22 23 24.5	19.09	6 28.27	1.076	19 6 42.99
Wed.	8	19 17 33.39	10.911	22 15 33.1	20.19	6 53.84	1.055	19 10 39.55
Thur.	9	19 21 55.01	10.889	22 7 15.5	21.27	7 18.90	1.033	19 14 36.11
Frid.	10	19 26 16.08	10.866	21 58 32.0	22.35	7 43.42	1.010	19 18 32.66
Sat.	11	19 30 36.59	10.842	21 49 22.7	23.41	8 7.37	0.986	19 22 29.22
Sun.	12	19 34 56.52	10.817	21 39 48.0	24.47	8 30.74	0.961	19 26 25.78
Mon.	13	19 39 15.85	10.792	21 29 48.0	25.51	8 53.51	0.936	19 30 22.34
Tues.	14	19 43 34.56	10.766	21 19 23.1	26.55	9 15.67	0.910	19 34 18.89
Wed.	15	19 47 52.64	10.739	21 8 33.7	27.57	9 37.19	0.883	19 38 15.45
Thur.	16	19 52 10.07	10.712	20 57 19.8	28.58	9 58.07	0.856	19 42 12.00
Frid.	17	19 56 26.83	10.683	20 45 41.8	29.58	10 18.27	0.827	19 46 8.56
Sat.	18	20 0 42.88	10.654	20 33 39.9	30.56	10 37.76	0.798	19 50 5.12
Sun.	19	20 4 58.22	10.624	20 21 14.8	31.53	10 56.54	0.769	19 54 1.68
Mon.	20	20 9 12.84	10.593	20 8 26.6	32.48	11 14.60	0.738	19 57 58.24
Tues.	21	20 13 26.71	10.562	19 55 15.6	33.42	11 31.91	0.706	20 1 54.80
Wed.	22	20 17 39.82	10.530	19 41 42.5	34.34	11 48.46	0.674	20 5 51.35
Thur.	23	20 21 52.15	10.497	19 27 47.5	35.25	12 4.24	0.641	20 9 47.91
Frid.	24	20 26 3.70	10.464	19 13 30.7	36.14	12 19.23	0.608	20 13 44.47
Sat.	25	20 30 14.45	10.430	18 58 52.8	37.01	12 33.42	0.575	20 17 41.03
Sun.	26	20 34 24.39	10.396	18 43 54.2	37.87	12 46.81	0.541	20 21 37.58
Mon.	27	20 38 33.51	10.362	18 28 35.2	38.71	12 59.38	0.506	20 25 34.14
Tues.	28	20 42 41.80	10.327	18 12 56.3	39.53	13 11.11	0.471	20 29 30.69
Wed.	29	20 46 49.25	10.293	17 56 57.9	40.33	13 22.00	0.436	20 33 27.25
Thur.	30	20 50 55.86	10.258	17 40 40.2	41.12	13 32.05	0.400	20 37 23.81
Frid.	31	20 55 1.63	10.222	17 24 3.9	41.89	13 41.26	0.365	20 41 20.37
Sat.	32	20 59 6.56	10.187	S. 17° 7' 9.2"	42.65	13 49.64	0.331	20 45 16.92

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

+ prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 hour.  
+9°.8565  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal 0 <sup>h</sup> .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	1	280° 45' 56.4	45° 41' 8"	152.90	+0.32	9.9926576	- 1.4	<sup>h</sup> 5 <sup>m</sup> 16 <sup>s</sup> 4.43	
2	2	281 47 6.0	46 51.2	152.89	0.33	.9926554	- 0.4	5 12 8.52	
3	3	282 48 15.2	48 0.2	152.88	0.32	.9926558	+ 0.6	5 8 12.61	
4	4	283 49 24.0	49 8.8	152.86	0.28	.9926586	1.7	5 4 16.71	
5	5	284 50 32.4	50 17.1	152.85	0.19	.9926641	2.9	5 0 20.80	
6	6	285 51 40.6	51 25.1	152.84	+0.10	.9926725	4.1	4 56 24.89	
7	7	286 52 48.6	52 32.9	152.83	-0.02	.9926838	5.2	4 52 28.98	
8	8	287 53 56.3	53 40.4	152.82	0.15	.9926978	6.4	4 48 33.05	
9	9	288 55 3.8	54 47.7	152.81	0.29	.9927147	7.6	4 44 37.14	
10	10	289 56 11.1	55 54.9	152.80	0.42	.9927346	8.8	4 40 41.23	
11	11	290 57 18.2	57 1.8	152.79	0.55	.9927572	9.9	4 36 45.32	
12	12	291 58 25.0	58 8.4	152.78	0.66	.9927824	11.0	4 32 49.40	
13	13	292 59 31.6	59 14.8	152.78	0.75	.9928102	12.0	4 28 53.49	
14	14	294 0 38.1	0 21.1	152.77	0.81	.9928405	13.0	4 24 57.58	
15	15	295 1 44.5	1 27.4	152.76	0.85	.9928731	13.9	4 21 1.66	
16	16	296 2 50.7	2 33.4	152.75	0.85	.9929079	14.8	4 17 5.76	
17	17	297 3 56.5	3 39.0	152.74	0.84	.9929448	15.7	4 13 9.85	
18	18	298 5 2.0	4 44.3	152.72	0.80	.9929835	16.5	4 9 13.94	
19	19	299 6 7.1	5 49.2	152.70	0.71	.9930239	17.2	4 5 18.03	
20	20	300 7 11.8	6 53.7	152.68	0.61	.9930660	17.9	4 1 22.11	
21	21	301 8 15.9	7 57.7	152.66	0.49	.9931098	18.6	3 57 26.20	
22	22	302 9 19.4	9 1.0	152.63	0.36	.9931553	19.2	3 53 30.29	
23	23	303 10 22.2	10 3.6	152.59	0.22	.9932023	19.9	3 49 34.38	
24	24	304 11 24.1	11 5.3	152.55	-0.09	.9932508	20.5	3 45 38.46	
25	25	305 12 24.8	12 6.0	152.51	+0.02	.9933006	21.1	3 41 42.55	
26	26	306 13 24.7	13 5.7	152.46	0.12	.9933519	21.7	3 37 46.64	
27	27	307 14 23.5	14 4.2	152.42	0.21	.9934049	22.4	3 33 50.73	
28	28	308 15 20.9	15 1.5	152.37	0.27	.9934597	23.2	3 29 54.82	
29	29	309 16 17.1	15 57.6	152.32	0.28	.9935162	23.9	3 25 58.91	
30	30	310 17 12.0	16 52.4	152.26	0.28	.9935746	24.7	3 22 3.00	
31	31	311 18 5.6	17 45.8	152.21	0.24	.9936349	23.6	3 18 7.09	
32	32	312 18 58.0	18 38.0	152.15	+0.19	9.9936973	+26.5	3 14 11.18	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>h</sup> 0.								Diff. for 1 hour. — 9 <sup>h</sup> .8296 (Table II.)	

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
1	14 48.2	14 48.8	54 13.0	+0.07	54 15.1	+0.28	<sup>h</sup> 6 <sup>m</sup> 36.9	<sup>m</sup> 1.76	<sup>d</sup> 8.6
2	14 50.1	14 52.1	54 19.9	0.50	54 27.2	0.70	7 20.3	1.87	9.6
3	14 54.6	14 57.8	54 36.7	0.88	54 48.4	1.05	8 6.7	2.01	10.6
4	15 1.5	15 5.6	55 1.9	1.20	55 17.1	1.33	8 56.5	2.15	11.6
5	15 10.2	15 15.0	55 33.7	1.43	55 51.3	1.50	9 49.5	2.27	12.6
6	15 20.0	15 25.1	56 9.7	1.55	56 28.5	1.57	10 44.8	2.33	13.6
7	15 30.2	15 35.3	56 47.4	1.56	57 6.0	1.53	11 40.8	2.32	14.6
8	15 40.2	15 44.8	57 24.0	1.46	57 41.1	1.38	12 35.9	2.26	15.6
9	15 49.2	15 53.2	57 57.1	1.28	58 11.8	1.36	13 29.0	2.16	16.6
10	15 56.8	16 0.0	58 25.0	1.04	58 36.6	0.90	14 19.8	2.07	17.6
11	16 2.7	16 5.0	58 46.6	0.76	58 54.9	0.63	15 8.8	2.02	18.6
12	16 6.8	16 8.2	59 1.6	0.50	59 6.8	0.37	15 56.9	2.00	19.6
13	16 9.2	16 9.9	59 10.5	0.25	59 12.8	+0.14	16 45.3	2.04	20.6
14	16 10.2	16 10.2	59 13.9	+0.04	59 13.9	-0.06	17 35.3	2.13	21.6
15	16 9.8	16 9.2	59 12.6	-0.15	59 10.3	0.23	18 27.9	2.26	22.6
16	16 8.3	16 7.0	59 6.9	0.32	59 2.5	0.41	19 23.7	2.40	23.6
17	16 5.5	16 3.7	58 57.0	0.50	58 50.4	0.60	20 22.4	2.50	24.6
18	16 1.5	15 59.1	58 42.5	0.71	58 33.4	0.81	21 22.8	2.52	25.6
19	15 56.3	15 53.1	58 23.1	0.91	58 11.5	1.02	22 22.5	2.44	26.6
20	15 49.7	15 45.8	57 58.6	1.12	57 44.5	1.21	23 19.6	2.30	27.6
21	15 41.7	15 37.4	57 29.4	1.29	57 13.3	1.36	δ		28.6
22	15 32.9	15 28.1	56 56.5	1.42	56 39.2	1.46	0 12.7	2.12	0.0
23	15 23.3	15 18.5	56 21.6	1.47	56 4.0	1.45	1 1.7	1.95	1.0
24	15 13.8	15 9.3	55 46.8	1.40	55 30.2	1.34	1 46.9	1.82	2.0
25	15 5.0	15 1.1	55 14.5	1.26	55 0.0	1.15	2 29.4	1.73	3.0
26	14 57.5	14 54.5	54 46.9	1.01	54 35.7	0.85	3 10.3	1.68	4.0
27	14 51.8	14 49.9	54 26.3	0.68	54 19.2	0.50	3 50.7	1.69	5.0
28	14 48.7	14 47.9	54 14.4	-0.30	54 11.9	-0.09	4 31.5	1.73	6.0
29	14 48.0	14 48.8	54 12.0	+0.12	54 14.8	+0.34	5 13.8	1.81	7.0
30	14 50.2	14 52.5	54 20.3	0.46	54 28.4	0.78	5 58.6	1.93	8.0
31	14 55.4	14 58.9	54 39.1	0.98	54 52.2	1.19	6 46.3	2.06	9.0
32	15 3.2	15 8.0	55 7.8	+1.39	55 25.6	+1.56	7 37.2	2.19	10.0

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 1.					FRIDAY 3.				
0	<sup>h</sup> 8 <sup>m</sup> 42.73 <sup>s</sup>	1.8507	N.12° 48' 48.7"	11.866	0	<sup>h</sup> 2 <sup>m</sup> 42 <sup>s</sup> 6.36	2.0590	N.21° 9' 21.8"	8.664
1	1 10 33.86	1.8538	13 0 39.4	11.890	1	2 44 10.06	2.0649	21 17 59.0	8.575
2	1 12 25.19	1.8571	13 12 27.1	11.771	2	2 46 14.07	2.0695	21 26 30.8	8.485
3	1 14 16.71	1.8603	13 24 11.9	11.722	3	2 48 18.40	2.0749	21 34 57.2	8.394
4	1 16 8.42	1.8635	13 35 53.7	11.672	4	2 50 23.06	2.0803	21 43 18.1	8.303
5	1 18 0.33	1.8668	13 47 32.5	11.622	5	2 52 28.04	2.0857	21 51 33.6	8.219
6	1 19 52.43	1.8701	13 50 8.3	11.571	6	2 54 33.34	2.0911	21 59 43.5	8.118
7	1 21 44.74	1.8736	14 10 41.0	11.518	7	2 56 38.97	2.0965	22 7 47.8	8.023
8	1 23 37.26	1.8772	14 22 10.5	11.464	8	2 58 44.02	2.1019	22 15 46.3	7.927
9	1 25 30.00	1.8807	14 33 36.7	11.410	9	3 0 51.20	2.1073	22 23 39.0	7.830
10	1 27 22.95	1.8843	14 44 59.7	11.356	10	3 2 57.80	2.1127	22 31 25.9	7.733
11	1 29 16.12	1.8881	14 56 19.4	11.301	11	3 5 4.73	2.1182	22 39 7.0	7.635
12	1 31 9.52	1.8918	15 7 35.8	11.245	12	3 7 11.99	2.1237	22 46 42.1	7.535
13	1 33 3.14	1.8956	15 18 48.8	11.188	13	3 9 19.58	2.1292	22 54 11.2	7.435
14	1 34 56.99	1.8995	15 29 58.3	11.130	14	3 11 27.49	2.1346	23 1 34.3	7.334
15	1 36 51.08	1.9034	15 41 4.4	11.072	15	3 13 35.73	2.1401	23 8 51.3	7.232
16	1 38 45.40	1.9073	15 52 7.0	11.012	16	3 15 44.30	2.1456	23 16 2.1	7.128
17	1 40 39.96	1.9114	16 3 5.9	10.952	17	3 17 53.20	2.1510	23 23 6.6	7.023
18	1 42 34.77	1.9155	16 14 1.2	10.891	18	3 20 2.42	2.1564	23 30 4.8	6.918
19	1 44 29.82	1.9196	16 24 52.8	10.829	19	3 22 11.97	2.1619	23 36 56.7	6.812
20	1 46 25.12	1.9238	16 35 40.7	10.767	20	3 24 21.85	2.1673	23 43 42.2	6.703
21	1 48 20.68	1.9281	16 46 24.9	10.705	21	3 26 32.05	2.1727	23 50 21.1	6.594
22	1 50 16.49	1.9323	16 57 5.3	10.640	22	3 28 42.58	2.1782	23 56 53.5	6.485
23	1 52 12.56	1.9367	N.17° 7' 41.7"	10.574	23	3 30 53.43	2.1836	N.24° 3' 19.3"	6.374
THURSDAY 2.					SATURDAY 4.				
0	1 54 8.89	1.9411	N.17° 18' 14.2"	10.509	0	3 33 4.61	2.1890	N.24° 9' 38.4"	6.262
1	1 56 5.49	1.9456	17 28 42.8	10.443	1	3 35 16.11	2.1943	24 15 50.8	6.150
2	1 58 2.86	1.9500	17 39 7.4	10.375	2	3 37 27.93	2.1997	24 21 56.4	6.037
3	1 59 59.49	1.9545	17 49 27.8	10.306	3	3 39 40.07	2.2050	24 27 55.2	5.923
4	2 1 56.90	1.9592	17 59 44.1	10.237	4	3 41 52.53	2.2103	24 33 47.1	5.807
5	2 3 54.59	1.9638	18 9 56.2	10.167	5	3 44 5.31	2.2156	24 39 32.0	5.690
6	2 5 52.55	1.9684	18 20 4.2	10.097	6	3 46 18.40	2.2208	24 45 9.9	5.572
7	2 7 50.80	1.9732	18 30 7.9	10.025	7	3 48 31.80	2.2259	24 50 40.7	5.454
8	2 9 49.33	1.9779	18 40 7.2	9.953	8	3 50 45.51	2.2311	24 56 4.4	5.334
9	2 11 48.15	1.9827	18 50 2.1	9.878	9	3 52 59.54	2.2363	25 1 20.8	5.213
10	2 13 47.26	1.9876	18 59 52.5	9.803	10	3 55 13.87	2.2414	25 6 30.0	5.092
11	2 15 46.66	1.9924	19 9 38.5	9.728	11	3 57 28.51	2.2465	25 11 31.9	4.970
12	2 17 46.35	1.9973	19 19 19.9	9.652	12	3 59 43.45	2.2515	25 16 26.4	4.847
13	2 19 46.34	2.0023	19 28 56.7	9.575	13	4 1 58.69	2.2565	25 21 13.5	4.723
14	2 21 46.63	2.0073	19 38 28.9	9.497	14	4 4 14.23	2.2614	25 25 53.1	4.597
15	2 23 47.22	2.0123	19 47 56.3	9.418	15	4 6 30.06	2.2663	25 30 25.1	4.470
16	2 25 48.11	2.0174	19 57 19.0	9.338	16	4 8 46.18	2.2711	25 34 49.5	4.343
17	2 27 49.31	2.0225	20 6 36.9	9.257	17	4 11 2.59	2.2759	25 39 6.2	4.215
18	2 29 50.81	2.0276	20 15 49.8	9.174	18	4 13 19.29	2.2807	25 43 15.3	4.087
19	2 31 52.62	2.0327	20 24 57.8	9.092	19	4 15 36.27	2.2853	25 47 16.6	3.956
20	2 33 54.74	2.0379	20 34 8.8	9.008	20	4 17 53.53	2.2899	25 51 10.0	3.825
21	2 35 57.17	2.0433	20 42 58.8	8.923	21	4 20 11.06	2.2944	25 54 55.6	3.694
22	2 37 59.92	2.0484	20 51 51.6	8.838	22	4 22 28.86	2.2989	25 58 33.3	3.562
23	2 40 2.98	2.0537	21 0 39.3	8.752	23	4 24 46.93	2.3034	26 2 3.0	3.428
24	2 42 6.36	2.0590	N.21° 9' 21.8"	8.664	24	4 27 5.27	2.3078	N.26° 5' 24.6"	3.293



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 5.					TUESDAY 7.				
0	4 27 5.27	2.3078	N.26 5 24.6	3.293	0	6 21 16.76	2.4132	N.25 56 27.6	3.823
1	4 29 23.87	2.3121	26 8 38.2	3.157	1	6 23 41.48	2.4118	25 52 33.6	3.976
2	4 31 42.72	2.3163	26 11 43.6	3.022	2	6 26 6.17	2.4113	25 48 30.5	4.128
3	4 34 1.83	2.3205	26 14 40.8	2.885	3	6 28 30.83	2.4107	25 44 18.2	4.282
4	4 36 21.18	2.3245	26 17 29.8	2.748	4	6 30 55.45	2.4100	25 39 56.7	4.434
5	4 38 40.77	2.3286	26 20 10.5	2.610	5	6 33 20.03	2.4092	25 35 26.1	4.587
6	4 41 0.61	2.3326	26 22 43.0	2.472	6	6 35 44.56	2.4084	25 30 46.3	4.739
7	4 43 20.68	2.3364	26 25 7.1	2.331	7	6 38 9.04	2.4074	25 25 57.4	4.891
8	4 45 40.98	2.3402	26 27 22.7	2.190	8	6 40 33.45	2.4063	25 20 59.4	5.043
9	4 48 1.50	2.3438	26 29 29.9	2.049	9	6 42 57.79	2.4051	25 15 52.3	5.194
10	4 50 22.24	2.3475	26 31 28.6	1.907	10	6 45 22.06	2.4039	25 10 36.1	5.345
11	4 52 43.20	2.3511	26 33 18.7	1.763	11	6 47 46.26	2.4026	25 5 10.9	5.495
12	4 55 4.37	2.3546	26 35 0.2	1.620	12	6 50 10.37	2.4011	24 59 36.7	5.645
13	4 57 25.75	2.3579	26 36 33.1	1.476	13	6 52 34.39	2.3998	24 53 53.5	5.795
14	4 59 47.32	2.3611	26 37 57.3	1.332	14	6 54 58.32	2.3979	24 48 1.3	5.944
15	5 2 9.08	2.3643	26 39 12.9	1.187	15	6 57 22.14	2.3968	24 42 0.2	6.092
16	5 4 31.03	2.3674	26 40 19.7	1.040	16	6 59 45.86	2.3944	24 35 50.2	6.240
17	5 6 53.17	2.3704	26 41 17.7	0.894	17	7 2 9.47	2.3926	24 29 31.4	6.388
18	5 9 15.48	2.3733	26 42 7.0	0.747	18	7 4 32.97	2.3908	24 23 3.7	6.535
19	5 11 37.96	2.3761	26 42 47.4	0.599	19	7 6 56.34	2.3885	24 16 27.2	6.681
20	5 14 0.61	2.3788	26 43 18.9	0.451	20	7 9 19.59	2.3864	24 9 42.0	6.827
21	5 16 23.42	2.3814	26 43 41.5	0.302	21	7 11 42.71	2.3840	24 2 48.0	6.972
22	5 18 46.38	2.3839	26 43 55.1	0.152	22	7 14 5.70	2.3819	23 55 45.3	7.116
23	5 21 9.49	2.3864	N.26 43 59.8	+0.063	23	7 16 28.54	2.3795	N.23 48 34.1	7.259
MONDAY 6.					WEDNESDAY 8.				
0	5 23 32.75	2.3887	N.26 43 55.5	-0.147	0	7 18 51.24	2.3771	N.23 41 14.3	7.402
1	5 25 56.14	2.3909	26 43 42.2	0.297	1	7 21 13.79	2.3746	23 33 45.9	7.544
2	5 28 19.66	2.3930	26 43 19.8	0.448	2	7 23 36.19	2.3721	23 26 9.0	7.686
3	5 30 43.30	2.3949	26 42 48.4	0.599	3	7 25 58.44	2.3694	23 18 23.6	7.827
4	5 33 7.05	2.3968	26 42 7.9	0.751	4	7 28 20.52	2.3667	23 10 29.8	7.966
5	5 35 30.92	2.3987	26 41 18.3	0.903	5	7 30 42.44	2.3639	23 2 27.7	8.105
6	5 37 54.89	2.4003	26 40 19.5	1.056	6	7 33 4.19	2.3611	22 54 17.2	8.243
7	5 40 18.96	2.4019	26 39 11.6	1.208	7	7 35 25.77	2.3582	22 45 58.5	8.380
8	5 42 43.12	2.4033	26 37 54.5	1.361	8	7 37 47.18	2.3553	22 37 31.6	8.517
9	5 45 7.36	2.4047	26 36 28.3	1.513	9	7 40 8.41	2.3523	22 28 56.5	8.653
10	5 47 31.68	2.4059	26 34 52.9	1.667	10	7 42 29.46	2.3492	22 20 13.3	8.787
11	5 49 56.07	2.4071	26 33 8.3	1.821	11	7 44 50.32	2.3461	22 11 22.1	8.920
12	5 52 20.53	2.4082	26 31 14.4	1.975	12	7 47 10.99	2.3430	22 2 22.9	9.053
13	5 54 45.05	2.4091	26 29 11.3	2.128	13	7 49 31.47	2.3398	21 53 15.7	9.185
14	5 57 9.62	2.4099	26 26 59.0	2.282	14	7 51 51.76	2.3366	21 44 0.7	9.315
15	5 59 34.23	2.4106	26 24 37.5	2.436	15	7 54 11.86	2.3333	21 34 37.9	9.444
16	6 1 58.89	2.4112	26 22 6.7	2.590	16	7 56 31.76	2.3300	21 25 7.4	9.573
17	6 4 23.58	2.4117	26 19 26.7	2.744	17	7 58 51.46	2.3267	21 15 29.2	9.701
18	6 6 48.29	2.4130	26 16 37.4	2.898	18	8 1 10.96	2.3233	21 5 43.3	9.828
19	6 9 13.02	2.4123	26 13 38.9	3.052	19	8 3 30.25	2.3198	20 55 49.8	9.954
20	6 11 37.77	2.4125	26 10 31.1	3.207	20	8 5 49.34	2.3164	20 45 48.8	10.078
21	6 14 2.52	2.4125	26 7 14.1	3.360	21	8 8 8.22	2.3129	20 35 40.4	10.202
22	6 16 27.27	2.4125	26 3 47.9	3.514	22	8 10 26.89	2.3094	20 25 24.6	10.324
23	6 18 52.02	2.4124	26 0 12.4	3.669	23	8 12 45.35	2.3059	20 15 1.5	10.445
24	6 21 16.76	2.4122	N.25 56 27.6	3.823	24	8 15 3.60	2.3023	N.20 4 31.2	10.564

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 9.					SATURDAY 11.				
0	<sup>h</sup> 8 <sup>m</sup> 15 <sup>s</sup> 3.60	2.3093	N. 20° 4' 31.2"	10.584	0	<sup>h</sup> 10 <sup>m</sup> 1 <sup>s</sup> 32.70	2.1449	N. 9° 43' 10.1"	14.808
1	8 17 21.63	2.2987	19 53 53.8	10.683	1	10 3 41.28	2.1418	9 28 19.9	14.863
2	8 19 39.45	2.2959	19 43 9.2	10.802	2	10 5 49.72	2.1394	9 13 26.5	14.917
3	8 21 57.05	2.2916	19 32 17.6	10.918	3	10 7 58.01	2.1371	8 58 29.9	14.969
4	8 24 14.44	2.2880	19 21 19.0	11.033	4	10 10 6.17	2.1350	8 43 30.2	15.020
5	8 26 31.61	2.2843	19 10 13.6	11.147	5	10 12 14.21	2.1329	8 28 27.5	15.068
6	8 28 48.56	2.2807	18 59 1.4	11.260	6	10 14 22.12	2.1308	8 13 22.0	15.115
7	8 31 5.30	2.2771	18 47 42.4	11.372	7	10 16 29.91	2.1288	7 58 13.7	15.162
8	8 33 21.81	2.2734	18 36 16.8	11.482	8	10 18 37.58	2.1268	7 43 2.6	15.207
9	8 35 38.10	2.2697	18 24 44.6	11.591	9	10 20 45.13	2.1249	7 27 48.8	15.251
10	8 37 54.17	2.2661	18 13 5.9	11.699	10	10 22 52.57	2.1232	7 12 32.5	15.293
11	8 40 10.03	2.2625	18 1 20.7	11.806	11	10 24 59.91	2.1214	6 57 13.7	15.333
12	8 42 25.67	2.2588	17 49 29.2	11.911	12	10 27 7.14	2.1197	6 41 52.5	15.372
13	8 44 41.09	2.2552	17 37 31.4	12.015	13	10 29 14.27	2.1181	6 26 29.0	15.410
14	8 46 56.29	2.2515	17 25 27.4	12.118	14	10 31 21.31	2.1166	6 11 3.3	15.446
15	8 49 11.27	2.2479	17 13 17.2	12.220	15	10 33 28.26	2.1151	5 55 35.5	15.481
16	8 51 26.04	2.2443	17 1 1.0	12.319	16	10 35 35.12	2.1137	5 40 5.6	15.514
17	8 53 40.59	2.2407	16 48 38.9	12.418	17	10 37 41.90	2.1124	5 24 33.8	15.546
18	8 55 54.92	2.2371	16 36 10.8	12.517	18	10 39 48.61	2.1119	5 9 0.1	15.577
19	8 58 9.04	2.2336	16 23 36.9	12.613	19	10 41 55.25	2.1100	4 53 24.6	15.606
20	9 0 22.95	2.2300	16 10 57.3	12.708	20	10 44 1.81	2.1088	4 37 47.4	15.633
21	9 2 36.64	2.2264	15 58 12.0	12.801	21	10 46 8.30	2.1077	4 22 8.6	15.660
22	9 4 50.12	2.2229	15 45 21.2	12.893	22	10 48 14.73	2.1067	4 6 28.2	15.685
23	9 7 3.39	2.2194	N. 15 32 24.8	12.985	23	10 50 21.11	2.1059	N. 3 50 46.4	15.708
FRIDAY 10.					SUNDAY 12.				
0	9 9 16.45	2.2159	N. 15 19 23.0	13.074	0	10 52 27.44	2.1051	N. 3 35 3.2	15.730
1	9 11 29.30	2.2125	15 6 15.9	13.162	1	10 54 33.72	2.1043	3 19 18.8	15.751
2	9 13 41.95	2.2092	14 53 3.5	13.249	2	10 56 39.96	2.1036	3 3 33.1	15.771
3	9 15 54.40	2.2058	14 39 46.0	13.334	3	10 58 46.16	2.1030	2 47 46.3	15.788
4	9 18 6.64	2.2024	14 26 23.4	13.418	4	11 0 52.32	2.1025	2 31 58.5	15.804
5	9 20 18.68	2.1991	14 12 55.8	13.502	5	11 2 58.46	2.1021	2 16 9.8	15.819
6	9 22 30.53	2.1958	13 59 23.2	13.583	6	11 5 4.58	2.1018	2 0 20.2	15.833
7	9 24 42.18	2.1926	13 45 45.8	13.663	7	11 7 10.68	2.1015	1 44 29.8	15.846
8	9 26 53.64	2.1893	13 32 3.6	13.742	8	11 9 16.76	2.1012	1 28 38.7	15.856
9	9 29 4.90	2.1862	13 18 16.8	13.819	9	11 11 22.83	2.1011	1 12 47.1	15.865
10	9 31 15.98	2.1831	13 4 25.4	13.895	10	11 13 28.89	2.1011	0 56 54.9	15.873
11	9 33 26.87	2.1799	12 50 29.4	13.970	11	11 15 34.96	2.1012	0 41 2.3	15.879
12	9 35 37.57	2.1768	12 36 29.0	14.042	12	11 17 41.03	2.1013	0 25 9.4	15.884
13	9 37 48.09	2.1739	12 22 24.3	14.114	13	11 19 47.11	2.1014	N. 0 9 16.2	15.888
14	9 39 58.44	2.1710	12 8 15.3	14.185	14	11 21 53.20	2.1017	S. 0 6 37.2	15.891
15	9 42 8.61	2.1680	11 54 2.1	14.253	15	11 23 59.31	2.1020	0 22 30.7	15.892
16	9 44 18.60	2.1652	11 39 44.9	14.320	16	11 26 5.44	2.1024	0 38 24.2	15.891
17	9 46 28.43	2.1624	11 25 23.7	14.387	17	11 28 11.60	2.1030	0 54 17.6	15.888
18	9 48 38.09	2.1596	11 10 58.5	14.452	18	11 30 17.80	2.1036	1 10 10.8	15.885
19	9 50 47.58	2.1568	10 56 29.5	14.514	19	11 32 24.03	2.1042	1 26 3.8	15.881
20	9 52 56.91	2.1542	10 41 56.8	14.576	20	11 34 30.30	2.1049	1 41 56.5	15.874
21	9 55 6.09	2.1517	10 27 20.4	14.637	21	11 36 36.62	2.1057	1 57 48.7	15.866
22	9 57 15.11	2.1491	10 12 40.4	14.696	22	11 38 42.99	2.1067	2 13 40.4	15.857
23	9 59 23.98	2.1466	9 57 56.9	14.752	23	11 40 49.42	2.1077	2 29 31.6	15.847
24	10 1 32.70	2.1442	N. 9 43 10.1	14.808	24	11 42 55.91	2.1087	S. 2 45 22.1	15.835

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION. AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 13.					WEDNESDAY 15.				
0	11 42 55.91	2.1087	S. 2° 45' 22.1	15.835	0	13 26 51.07	2.9468	S. 14° 44' 24.5	13.566
1	11 45 2.47	2.1089	3 1 11.8	15.822	1	13 29 6.13	2.9533	14 57 56.0	13.483
2	11 47 9.10	2.1111	3 17 0.7	15.807	2	13 31 21.47	2.9579	15 11 22.4	13.398
3	11 49 15.80	2.1123	3 32 48.6	15.790	3	13 33 37.08	2.9624	15 24 43.7	13.319
4	11 51 22.58	2.1137	3 48 35.5	15.773	4	13 35 52.96	2.9671	15 37 59.8	13.232
5	11 53 29.45	2.1152	4 4 21.4	15.754	5	13 38 9.13	2.9718	15 51 10.5	13.133
6	11 55 36.41	2.1167	4 20 6.0	15.733	6	13 40 25.58	2.9766	16 4 15.8	13.042
7	11 57 43.46	2.1184	4 35 49.3	15.711	7	13 42 42.32	2.9813	16 17 15.6	12.951
8	11 59 50.62	2.1202	4 51 31.3	15.688	8	13 44 59.34	2.9861	16 30 9.9	12.857
9	12 1 57.88	2.1219	5 7 11.9	15.664	9	13 47 16.65	2.9910	16 42 58.5	12.762
10	12 4 5.25	2.1238	5 22 51.0	15.637	10	13 49 34.26	2.9959	16 55 41.3	12.665
11	12 6 12.74	2.1258	5 38 28.4	15.609	11	13 51 52.16	2.3008	17 8 18.3	12.567
12	12 8 20.34	2.1278	5 54 4.1	15.580	12	13 54 10.35	2.3057	17 20 49.4	12.467
13	12 10 28.07	2.1299	6 9 38.0	15.550	13	13 56 28.84	2.3107	17 33 14.4	12.366
14	12 12 35.93	2.1320	6 25 10.1	15.518	14	13 58 47.63	2.3157	17 45 33.3	12.263
15	12 14 43.91	2.1342	6 40 40.2	15.485	15	14 1 6.72	2.3207	17 57 46.0	12.159
16	12 16 52.03	2.1366	6 56 8.3	15.450	16	14 3 26.12	2.3258	18 9 52.4	12.053
17	12 19 0.30	2.1391	7 11 34.2	15.413	17	14 5 45.82	2.3308	18 21 52.4	11.941
18	12 21 8.72	2.1416	7 26 57.9	15.376	18	14 8 5.82	2.3359	18 33 46.0	11.838
19	12 23 17.29	2.1442	7 42 19.3	15.337	19	14 10 26.13	2.3411	18 45 33.1	11.732
20	12 25 26.02	2.1468	7 57 38.3	15.296	20	14 12 46.75	2.3462	18 57 13.4	11.618
21	12 27 34.90	2.1494	8 12 54.8	15.254	21	14 15 7.67	2.3513	19 8 46.9	11.504
22	12 29 43.95	2.1522	8 28 8.8	15.211	22	14 17 28.90	2.3564	19 20 13.6	11.389
23	12 31 53.17	2.1551	S. 8 43 20.1	15.166	23	14 19 50.44	2.3616	S. 19 31 33.5	11.274
TUESDAY 14.					THURSDAY 16.				
0	12 34 2.56	2.1580	S. 8 58 28.7	15.120	0	14 22 12.30	2.3668	S. 19 42 46.4	11.154
1	12 36 12.13	2.1611	9 13 34.5	15.079	1	14 24 34.46	2.3719	19 53 52.2	11.038
2	12 38 21.89	2.1642	9 28 37.4	15.032	2	14 26 56.93	2.3771	20 4 50.8	10.918
3	12 40 31.83	2.1673	9 43 37.2	14.971	3	14 29 19.71	2.3822	20 15 42.1	10.794
4	12 42 41.96	2.1705	9 58 33.9	14.919	4	14 31 42.80	2.3874	20 26 26.1	10.673
5	12 44 52.29	2.1738	10 13 27.5	14.866	5	14 34 6.20	2.3925	20 37 2.7	10.548
6	12 47 2.82	2.1772	10 28 17.8	14.811	6	14 36 29.90	2.3976	20 47 31.8	10.423
7	12 49 13.55	2.1806	10 43 4.8	14.754	7	14 38 53.91	2.4027	20 57 53.3	10.294
8	12 51 24.49	2.1842	10 57 48.3	14.696	8	14 41 18.23	2.4079	21 8 7.1	10.165
9	12 53 35.65	2.1878	11 12 28.3	14.636	9	14 43 42.86	2.4130	21 18 13.1	10.035
10	12 55 47.03	2.1914	11 27 4.6	14.575	10	14 46 7.79	2.4180	21 28 11.3	9.904
11	12 57 58.62	2.1950	11 41 37.3	14.513	11	14 48 33.02	2.4231	21 38 1.6	9.771
12	13 0 10.43	2.1988	11 56 6.2	14.449	12	14 50 58.56	2.4282	21 47 43.8	9.636
13	13 2 22.47	2.2027	12 10 31.2	14.383	13	14 53 24.40	2.4331	21 57 17.9	9.501
14	13 4 34.75	2.2068	12 24 52.2	14.317	14	14 55 50.53	2.4380	22 6 43.9	9.365
15	13 6 47.26	2.2105	12 39 9.2	14.248	15	14 58 16.96	2.4429	22 16 1.7	9.227
16	13 9 0.01	2.2148	12 53 22.0	14.178	16	15 0 43.68	2.4478	22 25 11.1	9.087
17	13 11 13.01	2.2187	13 7 30.6	14.107	17	15 3 10.69	2.4527	22 34 12.1	8.947
18	13 13 26.25	2.2228	13 21 34.9	14.035	18	15 5 38.00	2.4575	22 43 4.7	8.805
19	13 15 39.74	2.2270	13 35 34.8	13.960	19	15 8 5.59	2.4622	22 51 48.7	8.663
20	13 17 53.49	2.2312	13 49 30.1	13.883	20	15 10 33.46	2.4668	23 0 24.1	8.517
21	13 20 7.49	2.2355	14 3 20.8	13.806	21	15 13 1.61	2.4715	23 8 50.7	8.370
22	13 22 21.75	2.2399	14 17 6.8	13.727	22	15 15 30.04	2.4762	23 17 8.5	8.223
23	13 24 36.28	2.2443	14 30 48.1	13.647	23	15 17 58.75	2.4807	23 25 17.5	8.076
24	13 26 51.07	2.2488	S. 14 44 24.5	13.566	24	15 20 27.72	2.4851	S. 23 33 17.6	7.927

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 17.					SUNDAY 19.				
0	15 <sup>h</sup> 20 <sup>m</sup> 27.72	2.4851	S. 23° 33' 17.6"	7.987	0	17 <sup>h</sup> 23 <sup>m</sup> 5.94	2.5781	S. 26° 44' 59.9"	+0.144
1	15 22 56.96	2.4895	23 41 8.7	7.776	1	17 25 40.59	2.5767	26 44 46.0	0.318
2	15 25 26.46	2.4939	23 48 50.7	7.694	2	17 28 15.15	2.5752	26 44 21.7	0.493
3	15 27 56.23	2.4982	23 56 23.6	7.472	3	17 30 49.61	2.5736	26 43 46.9	0.667
4	15 30 26.25	2.5023	24 3 47.3	7.318	4	17 33 23.98	2.5719	26 43 1.7	0.840
5	15 32 56.51	2.5064	24 11 1.8	7.163	5	17 35 58.24	2.5700	26 42 6.1	1.013
6	15 35 27.02	2.5105	24 18 6.9	7.007	6	17 38 32.38	2.5679	26 41 0.1	1.187
7	15 37 57.77	2.5145	24 25 2.6	6.850	7	17 41 6.39	2.5658	26 39 43.7	1.359
8	15 40 28.76	2.5183	24 31 48.9	6.692	8	17 43 40.27	2.5635	26 38 17.0	1.531
9	15 42 59.97	2.5221	24 38 25.7	6.533	9	17 46 14.01	2.5610	26 36 40.0	1.702
10	15 45 31.41	2.5258	24 44 52.9	6.373	10	17 48 47.59	2.5583	26 34 52.8	1.873
11	15 48 3.07	2.5295	24 51 10.4	6.212	11	17 51 21.01	2.5556	26 32 55.3	2.043
12	15 50 34.95	2.5330	24 57 18.3	6.051	12	17 53 54.26	2.5527	26 30 47.6	2.219
13	15 53 7.03	2.5364	25 3 16.5	5.887	13	17 56 27.34	2.5497	26 28 29.8	2.381
14	15 55 39.31	2.5397	25 9 4.8	5.723	14	17 59 0.23	2.5465	26 26 1.9	2.550
15	15 58 11.79	2.5429	25 14 43.3	5.559	15	18 1 32.92	2.5432	26 23 23.8	2.718
16	16 0 44.46	2.5460	25 20 11.9	5.394	16	18 4 5.41	2.5398	26 20 35.7	2.884
17	16 3 17.31	2.5490	25 25 30.6	5.228	17	18 6 37.70	2.5363	26 17 37.7	3.050
18	16 5 50.34	2.5519	25 30 39.3	5.061	18	18 9 9.77	2.5327	26 14 29.7	3.216
19	16 8 23.54	2.5547	25 35 37.9	4.893	19	18 11 41.62	2.5289	26 11 11.8	3.380
20	16 10 56.90	2.5573	25 40 26.5	4.726	20	18 14 13.24	2.5250	26 7 44.1	3.543
21	16 13 30.42	2.5599	25 45 5.0	4.557	21	18 16 44.62	2.5209	26 4 6.7	3.705
22	16 16 4.09	2.5623	25 49 33.3	4.387	22	18 19 15.75	2.5168	26 0 19.5	3.867
23	16 18 37.90	2.5646	S. 25 53 51.4	4.217	23	18 21 46.63	2.5126	S. 25 56 22.6	4.027
SATURDAY 18.					MONDAY 20.				
0	16 21 11.84	2.5667	S. 25 57 59.4	4.047	0	18 24 17.26	2.5083	S. 25 52 16.2	4.187
1	16 23 45.91	2.5688	26 1 57.1	3.875	1	18 26 47.62	2.5038	25 48 0.2	4.346
2	16 26 20.10	2.5708	26 5 44.4	3.702	2	18 29 17.71	2.4992	25 43 34.7	4.504
3	16 28 54.40	2.5726	26 9 21.4	3.530	3	18 31 47.52	2.4944	25 38 59.7	4.662
4	16 31 28.81	2.5743	26 12 48.0	3.357	4	18 34 17.04	2.4896	25 34 15.3	4.817
5	16 34 3.31	2.5758	26 16 4.2	3.184	5	18 36 46.27	2.4847	25 29 21.7	4.970
6	16 36 37.90	2.5772	26 19 10.1	3.011	6	18 39 15.21	2.4798	25 24 18.9	5.123
7	16 39 12.57	2.5784	26 22 5.5	2.837	7	18 41 43.85	2.4746	25 19 6.9	5.276
8	16 41 47.31	2.5795	26 24 50.5	2.662	8	18 44 12.17	2.4694	25 13 45.7	5.428
9	16 44 22.11	2.5805	26 27 25.0	2.487	9	18 46 40.18	2.4642	25 8 15.5	5.578
10	16 46 56.97	2.5814	26 29 49.0	2.312	10	18 49 7.87	2.4588	25 2 36.3	5.727
11	16 49 31.88	2.5821	26 32 2.5	2.138	11	18 51 35.24	2.4534	24 56 48.3	5.874
12	16 52 6.82	2.5826	26 34 5.6	1.963	12	18 54 2.28	2.4478	24 50 51.5	6.020
13	16 54 41.79	2.5830	26 35 58.1	1.787	13	18 56 28.98	2.4422	24 44 45.9	6.165
14	16 57 16.78	2.5833	26 37 40.0	1.611	14	18 58 55.34	2.4366	24 38 31.7	6.308
15	16 59 51.79	2.5835	26 39 11.4	1.436	15	19 1 21.37	2.4309	24 32 8.9	6.451
16	17 2 26.80	2.5834	26 40 32.3	1.260	16	19 3 47.05	2.4250	24 25 37.6	6.592
17	17 5 1.80	2.5832	26 41 42.6	1.084	17	19 6 12.37	2.4191	24 18 57.8	6.732
18	17 7 36.79	2.5830	26 42 4.4	0.908	18	19 8 37.34	2.4132	24 12 9.7	6.870
19	17 10 11.76	2.5826	26 43 31.6	0.732	19	19 11 1.95	2.4072	24 5 13.4	7.006
20	17 12 46.70	2.5819	26 44 10.3	0.557	20	19 13 26.20	2.4011	23 58 8.8	7.144
21	17 15 21.59	2.5811	26 44 38.5	0.382	21	19 15 50.08	2.3949	23 50 56.1	7.278
22	17 17 56.43	2.5802	26 44 56.2	0.207	22	19 18 13.59	2.3887	23 43 35.4	7.411
23	17 20 31.22	2.5792	26 45 3.3	-0.031	23	19 20 36.72	2.3824	23 36 6.8	7.542
24*	17 23 5.94	2.5781	S. 26 44 59.9	+0.144	24	19 22 59.48	2.3762	S. 23 28 30.3	7.673

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 21.					THURSDAY 23.				
0	19 22 59.48	2.3769	S. 23° 28' 30.3"	7.673	0	21 9 29.04	2.0651	S. 15° 18' 1.1"	12.909
1	19 25 21.86	2.3698	23 20 46.0	7.809	1	21 11 32.77	2.0593	15 5 47.1	12.961
2	19 27 43.86	2.3634	23 12 54.1	7.929	2	21 13 36.15	2.0535	14 53 29.7	12.918
3	19 30 5.47	2.3570	23 4 54.6	8.055	3	21 15 39.19	2.0477	14 41 8.9	12.975
4	19 32 26.70	2.3506	22 56 47.5	8.180	4	21 17 41.88	2.0420	14 28 44.7	12.932
5	19 34 47.54	2.3441	22 48 33.0	8.302	5	21 19 44.23	2.0363	14 16 17.1	12.987
6	19 37 7.99	2.3375	22 40 11.2	8.424	6	21 21 46.24	2.0307	14 3 46.3	12.939
7	19 39 28.04	2.3309	22 31 42.1	8.545	7	21 23 47.92	2.0252	13 51 12.4	12.991
8	19 41 47.70	2.3244	22 23 5.8	8.663	8	21 25 49.27	2.0197	13 38 35.4	12.941
9	19 44 6.97	2.3178	22 14 22.5	8.780	9	21 27 50.29	2.0143	13 25 55.5	12.989
10	19 46 25.84	2.3112	22 5 32.2	8.896	10	21 29 50.99	2.0090	13 13 1.7	12.737
11	19 48 44.31	2.3045	21 56 35.0	9.010	11	21 31 51.37	2.0036	13 0 27.0	12.784
12	19 51 2.38	2.2978	21 47 31.0	9.122	12	21 33 51.42	1.9983	12 47 38.6	12.829
13	19 53 20.05	2.2912	21 38 20.3	9.234	13	21 35 51.16	1.9932	12 34 47.5	12.873
14	19 55 37.32	2.2845	21 29 2.9	9.344	14	21 37 50.60	1.9881	12 21 53.8	12.916
15	19 57 54.19	2.2778	21 19 39.0	9.452	15	21 39 49.73	1.9830	12 8 57.6	12.957
16	20 0 10.66	2.2711	21 10 8.6	9.559	16	21 41 48.56	1.9780	11 55 58.9	12.998
17	20 2 26.72	2.2643	21 0 31.9	9.664	17	21 43 47.09	1.9731	11 42 57.8	13.036
18	20 4 42.38	2.2577	20 50 48.9	9.767	18	21 45 45.33	1.9682	11 29 54.3	13.077
19	20 6 57.64	2.2510	20 40 59.8	9.870	19	21 47 43.28	1.9634	11 16 48.6	13.113
20	20 9 12.50	2.2442	20 31 4.5	9.973	20	21 49 40.94	1.9586	11 3 40.7	13.146
21	20 11 26.95	2.2375	20 21 3.2	10.071	21	21 51 38.31	1.9538	10 50 30.8	13.183
22	20 13 41.00	2.2308	20 10 56.0	10.168	22	21 53 35.40	1.9499	10 37 18.8	13.217
23	20 15 54.65	2.2241	S. 20 0 43.0	10.265	23	21 55 32.22	1.9447	S. 10 24 4.8	13.249
WEDNESDAY 22.					FRIDAY 24.				
0	20 18 7.89	2.2174	S. 19 50 24.2	10.360	0	21 57 28.77	1.9409	S. 10 10 48.9	13.280
1	20 20 20.73	2.2108	19 39 59.8	10.453	1	21 59 25.05	1.9358	9 57 31.2	13.310
2	20 22 33.18	2.2042	19 29 29.8	10.545	2	22 1 21.07	1.9314	9 44 11.7	13.340
3	20 24 45.23	2.1975	19 18 54.4	10.635	3	22 3 16.82	1.9271	9 30 50.4	13.368
4	20 26 56.88	2.1909	19 8 13.6	10.724	4	22 5 12.32	1.9229	9 17 27.5	13.395
5	20 29 8.14	2.1843	18 57 27.5	10.812	5	22 7 7.57	1.9188	9 4 3.0	13.421
6	20 31 19.00	2.1777	18 46 36.2	10.898	6	22 9 2.58	1.9147	8 50 37.0	13.445
7	20 33 29.47	2.1712	18 35 39.8	10.982	7	22 10 57.34	1.9107	8 37 9.6	13.469
8	20 35 39.55	2.1647	18 24 38.4	11.065	8	22 12 51.86	1.9067	8 23 40.7	13.492
9	20 37 49.23	2.1581	18 13 32.0	11.147	9	22 14 46.15	1.9028	8 10 10.5	13.514
10	20 39 58.52	2.1517	18 2 20.7	11.227	10	22 16 40.20	1.8990	7 56 39.0	13.535
11	20 42 7.43	2.1453	17 51 4.7	11.306	11	22 18 34.03	1.8952	7 43 6.3	13.554
12	20 44 15.96	2.1389	17 39 44.0	11.383	12	22 20 27.63	1.8915	7 29 32.5	13.573
13	20 46 24.10	2.1325	17 28 18.7	11.459	13	22 22 21.01	1.8879	7 15 57.6	13.591
14	20 48 31.86	2.1262	17 16 48.9	11.533	14	22 24 14.18	1.8844	7 2 21.6	13.607
15	20 50 39.24	2.1199	17 5 14.7	11.607	15	22 26 7.14	1.8809	6 48 44.7	13.623
16	20 52 46.25	2.1137	16 53 36.1	11.679	16	22 27 59.89	1.8775	6 35 6.8	13.638
17	20 54 52.88	2.1074	16 41 53.2	11.749	17	22 29 52.44	1.8742	6 21 28.1	13.652
18	20 56 59.14	2.1012	16 30 6.2	11.817	18	22 31 44.80	1.8710	6 7 48.6	13.664
19	20 59 5.03	2.0952	16 18 15.1	11.885	19	22 33 36.96	1.8677	5 54 8.4	13.677
20	21 1 10.56	2.0891	16 6 20.0	11.952	20	22 35 28.93	1.8646	5 40 27.4	13.688
21	21 3 15.72	2.0830	15 54 20.9	12.017	21	22 37 20.71	1.8615	5 26 45.8	13.698
22	21 5 20.52	2.0770	15 42 18.0	12.079	22	22 39 12.31	1.8586	5 13 3.7	13.707
23	21 7 24.96	2.0710	15 30 11.4	12.141	23	22 41 3.74	1.8557	4 59 21.0	13.715
24	21 9 29.04	2.0651	S. 15 18 1.1	12.202	24	22 42 55.00	1.8529	S. 4 45 37.9	13.722

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 25.					MONDAY 27.				
0	<sup>h</sup> 22 <sup>m</sup> 42 <sup>s</sup> 55.00	1.8529	S. 4 45 37.9	13.722	0	<sup>h</sup> 0 9 55.79	1.7997	N. 6 6 9.2	13.147
1	22 44 46.09	1.8501	4 31 54.3	13.729	1	0 11 43.79	1.8003	6 19 17.2	13.118
2	22 46 37.01	1.8473	4 18 10.4	13.734	2	0 13 31.83	1.8009	6 32 23.4	13.088
3	22 48 27.77	1.8447	4 4 26.2	13.739	3	0 15 19.90	1.8016	6 45 27.9	13.059
4	22 50 18.37	1.8422	3 50 41.7	13.743	4	0 17 8.02	1.8025	6 58 30.5	13.027
5	22 52 8.83	1.8397	3 36 57.0	13.747	5	0 18 56.20	1.8034	7 11 31.1	12.994
6	22 53 59.14	1.8373	3 23 12.1	13.749	6	0 20 44.43	1.8043	7 24 29.8	12.962
7	22 55 49.31	1.8350	3 9 27.1	13.750	7	0 22 32.72	1.8053	7 37 26.5	12.928
8	22 57 39.34	1.8327	2 55 42.1	13.750	8	0 24 21.07	1.8063	7 50 21.2	12.895
9	22 59 29.23	1.8304	2 41 57.1	13.750	9	0 26 9.48	1.8074	8 3 13.9	12.860
10	23 1 18.99	1.8283	2 28 12.1	13.749	10	0 27 57.96	1.8087	8 16 4.4	12.824
11	23 3 8.63	1.8263	2 14 27.2	13.747	11	0 29 46.52	1.8099	8 28 52.8	12.788
12	23 4 58.15	1.8243	2 0 42.4	13.745	12	0 31 35.15	1.8119	8 41 39.0	12.752
13	23 6 47.55	1.8224	1 46 57.8	13.741	13	0 33 23.86	1.8126	8 54 23.0	12.714
14	23 8 36.84	1.8206	1 33 13.5	13.736	14	0 35 12.66	1.8141	9 7 4.7	12.677
15	23 10 26.02	1.8188	1 19 29.5	13.731	15	0 37 1.55	1.8156	9 19 44.2	12.638
16	23 12 15.09	1.8171	1 5 45.8	13.726	16	0 38 50.53	1.8172	9 32 21.3	12.598
17	23 14 4.07	1.8155	0 52 2.5	13.718	17	0 40 39.61	1.8189	9 44 56.0	12.558
18	23 15 52.95	1.8139	0 38 19.6	13.711	18	0 42 28.80	1.8207	9 57 28.3	12.518
19	23 17 41.74	1.8124	0 24 37.2	13.703	19	0 44 18.09	1.8224	10 9 58.2	12.477
20	23 19 30.44	1.8109	S. 0 10 55.3	13.694	20	0 46 7.49	1.8242	10 22 25.5	12.434
21	23 21 19.05	1.8096	N. 0 2 46.1	13.684	21	0 47 57.00	1.8261	10 34 50.3	12.392
22	23 23 7.59	1.8084	0 16 26.8	13.673	22	0 49 46.62	1.8281	10 47 12.6	12.349
23	23 24 56.06	1.8072	N. 0 30 6.9	13.662	23	0 51 36.37	1.8302	N. 10 59 32.2	12.305
SUNDAY 26.					TUESDAY 28.				
0	23 26 44.45	1.8060	N. 0 43 46.3	13.651	0	0 53 26.24	1.8323	N. 11 11 49.2	12.261
1	23 28 32.78	1.8049	0 57 25.0	13.637	1	0 55 16.24	1.8344	11 24 3.5	12.215
2	23 30 21.04	1.8039	1 11 2.8	13.623	2	0 57 6.37	1.8366	11 36 15.0	12.169
3	23 32 9.25	1.8031	1 24 39.8	13.609	3	0 58 56.63	1.8388	11 48 23.8	12.122
4	23 33 57.41	1.8022	1 38 15.9	13.594	4	1 0 47.03	1.8419	12 0 29.7	12.075
5	23 35 45.52	1.8014	1 51 51.1	13.579	5	1 2 37.58	1.8437	12 12 32.8	12.027
6	23 37 33.58	1.8007	2 5 25.4	13.562	6	1 4 28.28	1.8462	12 24 33.0	11.979
7	23 39 21.60	1.8001	2 18 58.6	13.545	7	1 6 19.13	1.8487	12 36 30.3	11.930
8	23 41 9.59	1.7995	2 32 30.8	13.527	8	1 8 10.13	1.8512	12 48 24.6	11.879
9	23 42 57.54	1.7990	2 46 1.9	13.508	9	1 10 1.28	1.8538	13 0 15.8	11.828
10	23 44 45.47	1.7986	2 59 31.8	13.489	10	1 11 52.59	1.8566	13 12 3.9	11.777
11	23 46 33.37	1.7982	3 13 0.6	13.470	11	1 13 44.07	1.8594	13 23 49.0	11.726
12	23 48 21.25	1.7979	3 26 28.2	13.449	12	1 15 35.72	1.8623	13 35 31.0	11.673
13	23 50 9.11	1.7977	3 39 54.5	13.428	13	1 17 27.54	1.8652	13 47 9.8	11.619
14	23 51 56.97	1.7976	3 53 19.5	13.406	14	1 19 19.54	1.8681	13 58 45.3	11.565
15	23 53 44.82	1.7974	4 6 43.2	13.383	15	1 21 11.71	1.8710	14 10 17.6	11.510
16	23 55 32.66	1.7974	4 20 5.5	13.360	16	1 23 4.06	1.8741	14 21 46.5	11.454
17	23 57 20.51	1.7975	4 33 26.4	13.336	17	1 24 56.60	1.8772	14 33 12.1	11.398
18	23 59 8.36	1.7976	4 46 45.8	13.311	18	1 26 49.33	1.8804	14 44 34.3	11.341
19	0 0 56.22	1.7977	5 0 3.7	13.285	19	1 28 42.25	1.8837	14 55 53.0	11.283
20	0 2 44.09	1.7980	5 13 20.0	13.259	20	1 30 35.37	1.8870	15 7 8.3	11.226
21	0 4 31.98	1.7983	5 26 34.8	13.233	21	1 32 28.69	1.8903	15 18 20.1	11.167
22	0 6 19.89	1.7987	5 39 48.0	13.206	22	1 34 22.21	1.8937	15 29 28.3	11.106
23	0 8 7.83	1.7992	5 52 59.5	13.177	23	1 36 15.94	1.8972	15 40 32.8	11.045
24	0 9 55.79	1.7997	N. 6 6 9.2	13.147	24	1 38 9.87	1.9007	N. 15 51 33.7	10.984

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 29.					FRIDAY 31.				
0	<sup>h</sup> 1 <sup>m</sup> 38 <sup>s</sup> 9.87	1.9007	N.15° 51' 33.7"	10.984	0	<sup>h</sup> 3 <sup>m</sup> 14 <sup>s</sup> 17.21	2.1174	N.23° 13' 14.1"	7.097
1	1 40 4.02	1.9042	16 2 30.9	10.922	1	3 16 24.41	2.1225	23 20 16.9	6.995
2	1 41 58.38	1.9078	16 13 24.4	10.860	2	3 18 31.91	2.1276	23 27 13.5	6.892
3	1 43 52.96	1.9115	16 24 14.1	10.796	3	3 20 39.72	2.1327	23 34 3.9	6.788
4	1 45 47.76	1.9152	16 34 59.9	10.732	4	3 22 47.84	2.1379	23 40 48.0	6.683
5	1 47 42.79	1.9190	16 45 41.9	10.667	5	3 24 56.27	2.1430	23 47 25.9	6.578
6	1 49 38.04	1.9228	16 56 20.0	10.601	6	3 27 5.00	2.1481	23 53 57.4	6.471
7	1 51 33.52	1.9267	17 6 54.1	10.534	7	3 29 14.04	2.1532	24 0 22.4	6.363
8	1 53 29.24	1.9306	17 17 24.1	10.467	8	3 31 23.39	2.1583	24 6 41.0	6.255
9	1 55 25.19	1.9345	17 27 50.1	10.399	9	3 33 33.04	2.1634	24 12 53.0	6.145
10	1 57 21.38	1.9385	17 38 12.0	10.330	10	3 35 43.00	2.1685	24 18 58.4	6.034
11	1 59 17.81	1.9426	17 48 29.7	10.260	11	3 37 53.26	2.1736	24 24 57.1	5.923
12	2 1 14.49	1.9467	17 58 43.2	10.190	12	3 40 3.83	2.1787	24 30 49.1	5.811
13	2 3 11.41	1.9508	18 8 52.5	10.118	13	3 42 14.70	2.1837	24 36 34.4	5.697
14	2 5 8.59	1.9551	18 18 57.4	10.046	14	3 44 25.87	2.1887	24 42 12.8	5.582
15	2 7 6.02	1.9593	18 28 58.0	9.973	15	3 46 37.35	2.1938	24 47 44.3	5.467
16	2 9 3.71	1.9636	18 38 54.2	9.900	16	3 48 49.13	2.1988	24 53 8.9	5.352
17	2 11 1.65	1.9678	18 48 46.0	9.826	17	3 51 1.21	2.2037	24 58 26.6	5.236
18	2 12 59.85	1.9722	18 58 33.3	9.751	18	3 53 13.58	2.2087	25 3 37.2	5.118
19	2 14 58.32	1.9767	19 8 16.1	9.675	19	3 55 26.25	2.2136	25 8 40.7	4.999
20	2 16 57.05	1.9811	19 17 54.3	9.597	20	3 57 39.21	2.2185	25 13 37.1	4.879
21	2 18 56.05	1.9856	19 27 27.8	9.519	21	3 59 52.47	2.2234	25 18 26.2	4.758
22	2 20 55.32	1.9901	19 36 56.6	9.441	22	4 2 6.02	2.2282	25 23 8.1	4.637
23	2 22 54.86	1.9947	N.19 46 20.7	9.362	23	4 4 19.86	2.2330	N.25 27 42.7	4.516
THURSDAY 30.					SATURDAY, FEBRUARY 1.				
0	2 24 54.68	1.9992	N.19 55 40.0	9.282	0	4 6 33.98	2.2377	N.25 32 10.0	4.393
1	2 26 54.77	2.0038	20 4 54.5	9.201	PHASES OF THE MOON.				
2	2 28 55.14	2.0086	20 14 4.1	9.118					
3	2 30 55.80	2.0133	20 23 8.7	9.035					
4	2 32 56.74	2.0180	20 32 8.3	8.952					
5	2 34 57.96	2.0228	20 41 2.9	8.869	$\bigcirc$ Full Moon, . . . <sup>d</sup> 7 <sup>h</sup> 23 <sup>m</sup> 47.7 $\text{C}$ Last Quarter, . . . 14 23 2.5 $\bullet$ New Moon, . . . 21 23 51.1 $\text{D}$ First Quarter, . . . 29 23 44.6				
6	2 36 59.47	2.0276	20 49 52.5	8.783					
7	2 39 1.27	2.0324	20 58 36.9	8.697					
8	2 41 3.36	2.0372	21 7 16.1	8.609					
9	2 43 5.73	2.0420	21 15 50.0	8.521	$\text{C}$ Perigee, . . . . <sup>d</sup> 14 <sup>h</sup> 5.1 $\text{C}$ Apogee, . . . . 28 17.6				
10	2 45 8.40	2.0469	21 24 18.6	8.433					
11	2 47 11.36	2.0518	21 32 41.9	8.344					
12	2 49 14.62	2.0568	21 40 59.9	8.254					
13	2 51 18.18	2.0618	21 49 12.4	8.162					
14	2 53 22.04	2.0667	21 57 19.3	8.069					
15	2 55 26.19	2.0717	22 5 20.7	7.977					
16	2 57 30.64	2.0767	22 13 16.5	7.883					
17	2 59 35.40	2.0818	22 21 6.6	7.788					
18	3 1 40.46	2.0868	22 28 51.0	7.692					
19	3 3 45.82	2.0919	22 36 29.6	7.595					
20	3 5 51.49	2.0970	22 44 2.4	7.497					
21	3 7 57.46	2.1021	22 51 29.3	7.399					
22	3 10 3.74	2.1072	22 58 50.3	7.299					
23	3 12 10.32	2.1123	23 6 5.2	7.198					
24	3 14 17.21	2.1174	N.23 13 14.1	7.097					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	SUN	W.	99 55 28	3468	101 16 28	3466	102 37 30	3463	103 58 35	3460
	Fomalhaut	W.	54 20 59	3682	55 38 27	3639	56 56 19	3619	58 14 33	3599
	α Pegasi	W.	31 35 37	3704	32 52 20	3653	34 9 57	3609	35 28 22	3568
	Saturn	W.	24 43 22	3250	26 8 32	3233	27 34 2	3219	28 59 49	3205
	Aldebaran	E.	48 28 52	3193	47 2 34	3198	45 36 22	3202	44 10 15	3206
	Pollux	E.	90 13 52	3094	88 45 35	3093	87 17 17	3091	85 48 56	3088
2	SUN	W.	110 44 58	3439	112 6 30	3433	113 28 9	3427	114 49 55	3421
	Fomalhaut	W.	64 50 49	3512	66 11 0	3496	67 31 29	3480	68 52 15	3465
	α Pegasi	W.	42 10 16	3414	43 32 17	3399	44 54 46	3365	46 17 42	3343
	Saturn	W.	36 12 28	3148	37 39 39	3138	39 7 2	3128	40 34 39	3118
	Aldebaran	E.	37 1 10	3237	35 35 44	3246	34 10 29	3257	32 45 27	3260
	Pollux	E.	78 26 17	3069	76 57 30	3065	75 28 37	3060	73 59 38	3054
3	SUN	W.	121 40 48	3380	123 3 27	3372	124 36 16	3362	125 49 16	3351
	Fomalhaut	W.	75 40 10	3395	77 2 32	3382	78 25 9	3369	79 48 1	3357
	α Pegasi	W.	53 18 24	3247	54 43 38	3229	56 9 13	3211	57 35 9	3194
	Saturn	W.	47 55 43	3067	49 24 33	3056	50 53 37	3045	52 22 54	3034
	Pollux	E.	66 32 45	3019	65 2 56	3011	63 32 57	3003	62 2 48	2995
	Regulus	E.	103 26 4	3000	101 55 51	2991	100 25 27	2982	98 54 52	2973
4	Fomalhaut	W.	86 45 56	3294	88 10 14	3283	89 34 45	3272	90 59 29	3262
	α Pegasi	W.	64 49 46	3114	66 17 39	3098	67 45 51	3083	69 14 21	3068
	Saturn	W.	59 52 47	2977	61 23 28	2965	62 54 25	2953	64 25 37	2941
	α Arietis	W.	21 15 44	3026	22 45 25	3002	24 15 35	2980	25 46 13	2950
	Pollux	E.	54 29 20	2950	52 58 4	2939	51 26 35	2930	49 54 54	2920
	Regulus	E.	91 18 56	2923	89 47 6	2912	88 15 2	2901	86 42 44	2890
5	Fomalhaut	W.	98 6 14	3211	99 32 10	3203	100 58 16	3194	102 24 32	3186
	α Pegasi	W.	76 41 29	2994	78 11 49	2980	79 42 27	2965	81 13 23	2951
	Saturn	W.	72 5 32	2978	73 38 19	2965	75 11 23	2952	76 44 44	2938
	α Arietis	W.	33 25 21	2972	34 58 16	2956	36 31 31	2941	38 5 6	2925
	Pollux	E.	42 13 20	2970	40 40 23	2962	39 7 15	2953	37 33 56	2945
	Regulus	E.	78 57 29	2929	77 23 39	2918	75 49 34	2905	74 15 13	2792
6	α Pegasi	W.	88 52 24	2984	90 25 3	2971	91 57 59	2959	93 31 11	2947
	Saturn	W.	84 35 41	2774	86 10 43	2761	87 46 2	2748	89 21 38	2735
	α Arietis	W.	45 57 57	2751	47 33 29	2737	49 9 20	2723	50 45 29	2709
	Regulus	E.	66 19 17	2729	64 43 15	2716	63 6 57	2704	61 30 22	2691
7	Saturn	W.	97 23 54	2672	99 1 11	2660	100 38 44	2649	102 16 33	2638
	α Arietis	W.	58 50 52	2642	60 28 50	2629	62 7 6	2616	63 45 39	2603
	Aldebaran	W.	27 50 19	2917	29 22 16	2876	30 55 6	2839	32 28 43	2806
	Regulus	E.	53 23 13	2629	51 44 58	2617	50 6 26	2605	48 27 38	2594
	Spica	E.	107 26 11	2629	105 47 55	2618	104 9 22	2604	102 30 33	2592
8	α Arietis	W.	72 2 37	2544	73 42 49	2533	75 23 17	2522	77 4 0	2512
	Aldebaran	W.	40 26 25	2678	42 3 34	2658	43 41 10	2639	45 19 12	2621
	Regulus	E.	40 9 47	2539	38 29 28	2530	36 48 56	2520	35 8 10	2510
	Spica	E.	94 12 23	2534	92 31 57	2523	90 51 16	2513	89 10 21	2503
9	α Arietis	W.	85 31 8	2462	87 13 14	2453	88 55 33	2445	90 38 4	2437
	Aldebaran	W.	53 35 1	2546	55 15 11	2533	56 55 39	2520	58 36 24	2509

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XV <sup>b</sup> .	P. L. of Diff.	XVIII <sup>b</sup> .	P. L. of Diff.	XX <sup>b</sup> .	P. L. of Diff.
1	Sun W.	105 19 44	3457	106 40 56	3454	108 2 12	3450	109 23 32	3445
	Fomalhaut W.	59 33 9	3580	60 52 5	3562	62 11 21	3545	63 30 56	3528
	α Pegasi W.	36 47 31	3532	38 7 20	3498	39 27 46	3469	40 48 45	3440
	Saturn W.	30 25 52	3193	31 52 10	3180	33 18 43	3169	34 45 29	3158
	Aldebaran E.	42 44 13	3211	41 18 17	3216	39 52 27	3223	38 26 45	3229
	Pollux E.	84 20 32	3066	82 52 5	3082	81 23 34	3078	79 54 58	3074
2	Sun W.	116 11 48	3414	117 33 49	3406	118 55 59	3397	120 18 19	3389
	Fomalhaut W.	70 13 18	3451	71 34 37	3437	72 56 12	3422	74 18 3	3408
	α Pegasi W.	47 41 4	3392	49 4 50	3392	50 28 59	3382	51 53 31	3364
	Saturn W.	42 2 27	3108	43 30 27	3097	44 58 40	3087	46 27 5	3077
	Aldebaran E.	31 20 39	3283	29 56 8	3301	28 31 57	3322	27 8 11	3347
	Pollux E.	72 30 32	3047	71 1 18	3041	69 31 56	3034	68 2 25	3026
3	Sun W.	127 12 28	3341	128 35 52	3331	129 59 28	3320	131 23 16	3308
	Fomalhaut W.	81 11 7	3344	82 34 28	3331	83 58 3	3319	85 21 52	3306
	α Pegasi W.	59 1 26	3178	60 28 2	3162	61 54 57	3145	63 22 12	3129
	Saturn W.	53 52 25	3022	55 22 10	3011	56 52 9	3001	58 22 21	2989
	Pollux E.	60 32 29	2986	59 1 59	2977	57 31 17	2968	56 0 24	2959
	Regulus E.	97 24 6	2964	95 53 8	2954	94 21 57	2943	92 50 33	2933
4	Fomalhaut W.	92 24 25	2951	93 49 34	2940	95 14 56	2930	96 40 29	2920
	α Pegasi W.	70 43 10	3053	72 12 17	3038	73 41 43	3023	75 11 27	3009
	Saturn W.	65 57 4	2928	67 28 47	2916	69 0 46	2903	70 33 1	2891
	α Arietis W.	27 17 17	2940	28 48 45	2923	30 20 35	2905	31 52 47	2888
	Pollux E.	48 23 0	2910	46 50 54	2900	45 18 35	2890	43 46 4	2880
	Regulus E.	85 10 11	2878	83 37 24	2866	82 4 21	2854	80 31 3	2841
5	Fomalhaut W.	103 50 58	2179	105 17 32	2173	106 44 14	2167	108 11 3	2169
	α Pegasi W.	82 44 37	2936	84 16 8	2924	85 47 56	2911	87 20 1	2897
	Saturn W.	78 18 22	2825	79 52 17	2813	81 26 28	2800	83 0 56	2787
	α Arietis W.	39 39 1	2810	41 13 16	2795	42 47 50	2780	44 22 44	2766
	Pollux E.	36 0 26	2836	34 26 45	2828	32 52 54	2821	31 18 54	2815
	Regulus E.	72 40 35	2780	71 5 41	2767	69 30 30	2754	67 55 2	2741
6	α Pegasi W.	95 4 38	2835	96 38 21	2823	98 12 19	2811	99 46 32	2801
	Saturn W.	90 57 32	2722	92 33 43	2710	94 10 10	2697	95 46 54	2685
	α Arietis W.	52 21 57	2695	53 58 43	2681	55 35 48	2668	57 13 11	2655
	Regulus E.	59 53 30	2678	58 16 21	2666	56 38 55	2653	55 1 12	2641
7	Saturn W.	103 54 37	2626	105 32 57	2615	107 11 32	2604	108 50 22	2593
	α Arietis W.	65 24 30	2391	67 3 37	2379	68 43 1	2367	70 22 41	2356
	Aldebaran W.	34 3 3	2776	35 38 2	2749	37 13 37	2734	38 49 45	2720
	Regulus E.	46 48 35	2583	45 9 16	2573	43 29 42	2560	41 49 52	2549
	Spica E.	100 51 27	2580	99 12 5	2569	97 32 27	2557	95 52 33	2545
8	α Arietis W.	78 44 57	2501	80 26 9	2491	82 7 35	2481	83 49 15	2472
	Aldebaran W.	46 57 38	2604	48 36 27	2588	50 15 38	2573	51 55 10	2559
	Regulus E.	33 27 11	2502	31 46 0	2493	30 4 37	2485	28 23 3	2478
	Spica E.	87 29 12	2492	85 47 48	2482	84 6 10	2472	82 24 18	2463
9	α Arietis W.	92 20 46	2429	94 3 40	2421	95 46 45	2414	97 30 0	2406
	Aldebaran W.	60 17 24	2498	61 53 40	2487	63 40 11	2477	65 21 56	2469

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
9	Regulus	E.	26° 41' 19"	2472	24° 59' 26"	2466	23° 17' 25"	2461	21° 35' 17"	2458
	Spica	E.	80 42 13	2454	78 59 55	2445	77 17 25	2437	75 34 43	2429
10	α Arietis	W.	99 13 26	2400	100 57 1	2394	102 40 45	2387	104 24 38	2381
	Aldebaran	W.	67 3 53	2460	68 46 3	2451	70 28 25	2443	72 10 58	2436
	Pollux	W.	24 47 7	2494	26 28 28	2475	28 10 16	2459	29 52 27	2444
	Spica	E.	66 58 28	2392	65 14 42	2386	63 30 47	2380	61 46 44	2374
	Antares	E.	112 44 33	2384	111 0 36	2378	109 16 30	2372	107 32 15	2366
11	Aldebaran	W.	80 46 6	2405	82 29 33	2400	84 13 7	2396	85 56 47	2392
	Pollux	W.	38 27 56	2391	40 11 44	2382	41 55 44	2375	43 39 54	2368
	Spica	E.	53 4 31	2350	51 19 45	2346	49 34 53	2343	47 49 56	2340
	Antares	E.	98 48 57	2339	97 3 55	2335	95 18 47	2332	93 33 34	2328
	Mars	E.	103 32 24	2375	101 52 54	2370	100 13 18	2365	98 33 35	2361
	SUN	E.	141 51 4	2670	140 13 44	2665	138 36 17	2660	136 58 43	2656
12	Aldebaran	W.	94 36 25	2377	96 20 33	2375	98 4 43	2373	99 48 56	2372
	Pollux	W.	52 22 52	2344	54 7 47	2340	55 52 48	2336	57 37 55	2333
	Regulus	W.	15 22 25	2371	17 6 41	2357	18 51 17	2347	20 36 8	2339
	Spica	E.	39 4 11	2329	37 18 54	2328	35 33 36	2328	33 48 17	2327
	Antares	E.	84 46 10	2312	83 0 28	2310	81 14 43	2308	79 28 55	2305
	Mars	E.	90 13 45	2345	88 33 34	2342	86 53 19	2340	85 13 1	2337
	SUN	E.	128 49 36	2638	127 11 33	2635	125 33 26	2633	123 55 16	2631
13	Aldebaran	W.	108 30 19	2371	110 14 36	2372	111 58 51	2373	113 43 5	2374
	Pollux	W.	66 24 29	2322	68 9 57	2320	69 55 27	2319	71 40 58	2319
	Regulus	W.	29 22 38	2316	31 8 14	2314	32 53 53	2311	34 39 36	2309
	Antares	E.	70 39 13	2298	68 53 11	2298	67 7 8	2297	65 21 4	2296
	Mars	E.	76 50 51	2330	75 10 20	2330	73 29 48	2329	71 49 15	2328
	SUN	E.	115 43 46	2623	114 5 22	2622	112 26 57	2621	110 48 31	2620
14	Pollux	W.	80 28 51	2316	82 14 27	2316	84 0 3	2316	85 45 39	2317
	Regulus	W.	43 28 42	2305	45 14 34	2304	47 0 27	2304	48 46 21	2304
	Antares	E.	56 30 34	2296	54 44 28	2296	52 58 22	2296	51 12 17	2297
	Mars	E.	63 26 25	2329	61 45 52	2329	60 5 19	2330	58 24 48	2331
	SUN	E.	102 36 8	2619	100 57 39	2619	99 19 10	2620	97 40 42	2621
15	Pollux	W.	94 33 24	2321	96 18 53	2322	98 4 20	2324	99 49 45	2325
	Regulus	W.	57 35 42	2307	59 21 32	2308	61 7 20	2309	62 53 6	2310
	Antares	E.	42 22 5	2301	40 36 7	2302	38 50 10	2303	37 4 15	2304
	Mars	E.	50 2 37	2339	48 22 18	2340	46 42 1	2343	45 1 47	2345
	SUN	E.	89 28 36	2624	87 50 14	2626	86 11 54	2627	84 33 36	2629
16	Pollux	W.	108 36 11	2336	110 21 18	2338	112 6 22	2341	113 51 22	2344
	Regulus	W.	71 41 29	2318	73 27 2	2320	75 12 33	2322	76 58 0	2324
	Spica	W.	17 49 3	2376	19 33 12	2368	21 17 32	2363	23 2 0	2360
	Antares	E.	28 15 14	2313	26 29 33	2315	24 43 55	2317	22 58 21	2320
	Mars	E.	36 41 38	2362	35 1 51	2366	33 22 10	2371	31 42 35	2377
	SUN	E.	76 22 39	2638	74 44 35	2640	73 6 34	2642	71 28 36	2644
17	Regulus	W.	85 44 25	2337	87 29 31	2340	89 14 32	2344	90 59 28	2347
	Spica	W.	31 45 11	2355	33 29 50	2356	35 14 28	2357	36 59 4	2359
	SUN	E.	63 19 39	2659	61 42 4	2662	60 4 33	2666	58 27 7	2669

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
9	Regulus	E.	19° 53' 5"	9457	18° 10' 51"	9458	16° 28' 38"	9463	14° 46' 32"	9479
	Spica	E.	73 51 50	9422	72 8 46	9414	70 25 31	9406	68 42 5	9398
10	α Arietis	W.	106 8 40	9376	107 52 49	9371	109 37 6	9366	111 21 30	9369
	Aldebaran	W.	73 53 41	9429	75 36 34	9423	77 19 36	9417	79 2 47	9411
	Pollux	W.	31 34 59	9431	33 17 50	9419	35 0 58	9409	36 44 20	9399
	Spica	E.	60 2 32	9369	58 18 12	9364	56 33 45	9359	54 49 11	9355
	Antares	E.	105 47 51	9360	104 3 19	9355	102 18 39	9350	100 23 52	9344
11	Aldebaran	W.	87 40 33	9389	89 24 24	9385	91 8 20	9382	92 52 21	9380
	Pollux	W.	45 24 14	9369	47 8 43	9357	48 53 20	9353	50 38 3	9348
	Spica	E.	46 4 54	9337	44 19 48	9335	42 34 39	9332	40 49 26	9330
	Antares	E.	91 48 15	9394	90 2 51	9391	88 17 22	9318	86 31 48	9315
	Mars	E.	96 53 47	9557	95 13 53	9554	93 33 55	9551	91 53 52	9548
	SUN	E.	135 21 4	9652	133 43 20	9648	132 5 30	9644	130 27 35	9641
12	Aldebaran	W.	101 33 11	9371	103 17 27	9371	105 1 44	9370	106 46 2	9371
	Pollux	W.	59 23 7	9330	61 8 23	9328	62 53 42	9326	64 39 4	9324
	Regulus	W.	22 21 10	9333	24 6 21	9296	25 51 40	9323	27 37 6	9319
	Spica	E.	32 2 57	9328	30 17 38	9328	28 32 20	9330	26 47 5	9334
	Antares	E.	77 43 3	9303	75 57 8	9309	74 11 11	9301	72 25 13	9300
	Mars	E.	83 32 39	9535	81 52 15	9534	80 11 49	9533	78 31 21	9531
	SUN	E.	122 17 3	9629	120 38 48	9627	119 0 30	9625	117 22 9	9624
13	Aldebaran	W.	115 27 17	9378	117 11 26	9378	118 55 32	9381	120 39 34	9384
	Pollux	W.	73 26 30	9318	75 12 4	9317	76 57 39	9316	78 43 15	9316
	Regulus	W.	36 25 22	9308	38 11 10	9307	39 56 59	9306	41 42 50	9305
	Antares	E.	63 34 59	9296	61 48 53	9296	60 2 47	9296	58 16 41	9295
	Mars	E.	70 8 41	9529	68 28 7	9529	66 47 33	9529	65 6 59	9528
	SUN	E.	109 10 3	9620	107 31 35	9619	105 53 6	9619	104 14 37	9619
14	Pollux	W.	87 31 14	9317	89 16 48	9318	91 2 21	9319	92 47 53	9320
	Regulus	W.	50 32 15	9304	52 18 8	9305	54 4 0	9306	55 49 51	9308
	Antares	E.	49 26 13	9298	47 40 10	9298	45 54 7	9298	44 8 5	9300
	Mars	E.	56 44 18	9532	55 3 50	9533	53 23 23	9535	51 42 59	9537
	SUN	E.	96 2 15	9621	94 23 49	9622	92 45 24	9623	91 7 0	9623
15	Pollux	W.	101 35 8	9326	103 20 29	9328	105 5 47	9331	106 51 1	9334
	Regulus	W.	64 38 51	9311	66 24 34	9313	68 10 15	9315	69 55 53	9316
	Antares	E.	35 18 22	9306	33 32 31	9308	31 46 43	9309	30 0 57	9311
	Mars	E.	43 21 37	9548	41 41 30	9551	40 1 28	9554	38 21 30	9558
	SUN	E.	82 55 20	9630	81 17 6	9632	79 38 55	9634	78 0 46	9635
16	Pollux	W.	115 36 18	9347	117 21 9	9350	119 5 55	9354	120 50 36	9357
	Regulus	W.	78 43 24	9327	80 28 44	9329	82 14 1	9331	83 59 15	9334
	Spica	W.	24 46 33	9357	26 31 10	9355	28 15 50	9354	30 0 31	9355
	Antares	E.	21 12 51	9322	19 27 24	9324	17 42 0	9327	15 56 40	9330
	Mars	E.	30 3 8	9583	28 23 49	9590	26 44 40	9598	25 5 42	9607
	SUN	E.	69 50 41	9647	68 12 50	9649	66 35 2	9652	64 57 18	9656
17	Regulus	W.	92 44 19	9350	94 29 5	9354	96 13 46	9358	97 58 21	9368
	Spica	W.	38 43 37	9369	40 28 7	9364	42 12 33	9367	43 56 55	9371
	SUN	E.	56 49 45	9672	55 12 28	9677	53 35 17	9681	51 58 12	9685

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
18	Regulus	W.	99° 42' 51"	2366	101° 27' 15"	2371	103° 11' 32"	2375	104° 55' 42"	2380
	Spica	W.	45 41 12	2374	47 25 24	2378	49 9 31	2382	50 53 32	2385
	SUN	E.	50 21 12	2689	48 44 18	2695	47 7 31	2699	45 30 50	2704
19	Regulus	W.	113 34 42	2408	115 18 6	2414	117 1 21	2420	118 44 27	2427
	Spica	W.	59 32 1	2411	61 15 20	2417	62 58 31	2422	64 41 34	2429
	SUN	E.	37 29 14	2734	35 53 19	2740	34 17 32	2747	32 41 54	2753
24	SUN	W.	23 51 1	3158	25 18 1	3170	26 44 46	3183	28 11 15	3196
	α Arietis	E.	67 59 48	2811	66 25 34	2824	64 51 37	2836	63 17 56	2848
	Aldebaran	E.	100 19 2	2860	98 45 52	2873	97 12 57	2883	95 40 16	2894
25	SUN	W.	35 19 57	3258	36 44 58	3269	38 9 46	3281	39 34 20	3293
	α Arietis	E.	55 33 22	2908	54 1 13	2920	52 29 19	2931	50 57 40	2942
	Aldebaran	E.	88 0 29	2950	86 29 14	2962	84 58 14	2973	83 27 27	2984
26	SUN	W.	46 33 55	3345	47 57 14	3356	49 20 21	3365	50 43 18	3374
	α Arietis	E.	43 22 58	2999	41 52 44	3009	40 22 43	3020	38 52 55	3031
	Aldebaran	E.	75 56 53	3035	74 27 24	3046	72 58 8	3056	71 29 4	3065
27	SUN	W.	57 35 34	3414	58 57 35	3421	60 19 28	3427	61 41 14	3432
	Fomalhaut	W.	40 59 42	4006	42 11 16	3958	43 23 39	3913	44 36 46	3873
	α Arietis	E.	31 27 18	3086	29 58 51	3097	28 30 38	3109	27 2 39	3122
	Aldebaran	E.	64 6 37	3110	62 38 40	3119	61 10 54	3128	59 43 17	3135
	Pollux	E.	106 6 59	3059	104 37 50	3057	103 8 48	3063	101 39 53	3068
28	SUN	W.	68 28 35	3456	69 49 48	3459	71 10 58	3461	72 32 6	3463
	Fomalhaut	W.	50 51 19	3723	52 7 42	3700	53 24 29	3678	54 41 39	3658
	α Pegasi	W.	28 8 11	3866	29 22 5	3797	30 37 10	3738	31 53 17	3687
	Saturn	W.	18 54 3	3369	20 16 55	3338	21 40 23	3312	23 4 21	3290
	Aldebaran	E.	52 27 35	3173	51 0 54	3180	49 34 21	3188	48 7 57	3194
	Pollux	E.	94 16 42	3087	92 48 17	3091	91 19 56	3093	89 51 38	3095
29	SUN	W.	79 17 23	3465	80 38 26	3463	81 59 31	3462	83 20 37	3460
	Fomalhaut	W.	61 12 26	3575	62 31 28	3561	63 50 45	3547	65 10 17	3534
	α Pegasi	W.	38 25 38	3505	39 45 57	3478	41 6 46	3453	42 28 3	3430
	Saturn	W.	30 9 16	3221	31 35 0	3212	33 0 55	3203	34 27 1	3194
	Aldebaran	E.	40 58 10	3224	39 32 41	3243	38 7 23	3253	36 42 17	3264
	Pollux	E.	82 30 30	3097	81 2 17	3096	79 34 3	3095	78 5 47	3093
30	SUN	W.	90 6 58	3441	91 28 28	3435	92 50 5	3430	94 11 48	3423
	Fomalhaut	W.	71 51 29	3473	73 12 23	3461	74 33 31	3450	75 54 51	3438
	α Pegasi	W.	49 20 25	3334	50 43 57	3318	52 7 48	3301	53 31 58	3286
	Saturn	W.	41 40 1	3153	43 7 7	3144	44 34 23	3135	46 1 50	3127
	Pollux	E.	70 43 44	3078	69 15 7	3073	67 46 24	3067	66 17 34	3061
	Regulus	E.	107 38 20	3060	106 9 21	3054	104 40 15	3048	103 11 2	3043
31	SUN	W.	101 2 29	3382	102 25 6	3372	103 47 54	3362	105 10 54	3351
	Fomalhaut	W.	82 44 42	3383	84 7 18	3372	85 30 6	3361	86 53 7	3351
	α Pegasi	W.	60 37 17	3211	62 3 13	3196	63 29 27	3182	64 55 58	3167
	Saturn	W.	53 21 47	3079	54 50 22	3069	56 19 10	3058	57 48 11	3047
	Pollux	E.	58 51 35	3029	57 21 58	3021	55 52 11	3019	54 22 13	3004
	Regulus	E.	95 42 54	3005	94 12 47	2997	92 42 30	2987	91 12 1	2977

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
18	Regulus	W.	106° 39' 45"	8386	108° 23' 41"	8390	110° 2' 30"	8396	111° 51' 11"	8403
	Spica	W.	52 37 28	8390	54 21 17	8395	56 4 59	8400	57 48 34	8406
	Sun	E.	43 54 16	8710	42 17 49	8716	40 41 30	8721	39 5 18	8727
19	Regulus	W.	120 27 23	9434	122 10 9	9441	123 52 46	9448	125 35 12	9455
	Spica	W.	66 24 28	9435	68 7 13	9441	69 49 49	9448	71 32 15	9457
	Sun	E.	31 6 25	9760	29 31 5	9768	27 55 55	9776	26 20 56	9785
24	Sun	W.	29 37 29	3009	31 3 28	3091	32 29 12	3033	33 54 42	3046
	α Arietis	E.	61 44 30	9890	60 11 20	9873	58 38 25	9884	57 5 46	9896
	Aldebaran	E.	94 7 50	2905	92 35 38	2917	91 3 41	2928	89 31 58	2939
25	Sun	W.	40 58 40	3304	42 22 47	3314	43 46 42	3325	45 10 25	3336
	α Arietis	E.	49 26 15	2964	47 55 4	2965	46 24 8	2977	44 53 26	2988
	Aldebaran	E.	81 56 54	2994	80 26 34	3005	78 56 28	3015	77 26 34	3026
26	Sun	W.	52 6 4	3383	53 28 40	3391	54 51 7	3399	56 13 25	3407
	α Arietis	E.	37 23 21	3049	35 54 0	3053	34 24 53	3064	32 55 59	3074
	Aldebaran	E.	70 0 12	3074	68 31 31	3084	67 3 2	3093	65 34 44	3102
27	Sun	W.	63 2 54	3438	64 24 28	3443	65 45 56	3448	67 7 18	3453
	Fomalhaut	W.	45 50 33	3837	47 4 57	3805	48 19 54	3775	49 35 22	3747
	α Arietis	E.	25 34 56	3136	24 7 30	3151	22 40 22	3168	21 13 34	3185
	Aldebaran	E.	58 15 50	3143	56 48 32	3151	55 21 24	3158	53 54 25	3166
	Pollux	E.	100 11 4	3073	98 42 21	3077	97 13 43	3081	95 45 10	3085
28	Sun	W.	73 53 12	3464	75 14 16	3465	76 35 19	3468	77 56 21	3466
	Fomalhaut	W.	55 59 11	3639	57 17 3	3622	58 35 13	3606	59 53 41	3590
	α Pegasi	W.	33 10 18	3643	34 28 7	3609	35 46 39	3566	37 5 51	3534
	Saturn	W.	24 28 44	3273	25 53 28	3258	27 18 29	3245	28 43 45	3232
	Aldebaran	E.	46 41 41	3202	45 15 34	3210	43 49 37	3218	42 23 49	3225
29	Pollux	E.	88 23 22	3096	86 55 8	3097	85 26 55	3097	83 58 42	3096
	Sun	W.	84 41 46	3457	86 2 58	3454	87 24 13	3450	88 45 33	3446
	Fomalhaut	W.	66 30 4	3531	67 50 5	3508	69 10 20	3497	70 30 48	3485
	α Pegasi	W.	43 49 46	3406	45 11 53	3389	46 34 22	3370	47 57 13	3351
	Saturn	W.	35 53 17	3186	37 19 43	3178	38 46 19	3169	40 13 5	3161
30	Aldebaran	E.	35 17 23	3276	33 52 43	3289	32 28 19	3305	31 4 13	3323
	Pollux	E.	76 37 20	3091	75 9 8	3088	73 40 44	3085	72 12 16	3089
	Sun	W.	95 33 39	3415	96 55 38	3408	98 17 45	3400	99 40 2	3391
31	Fomalhaut	W.	77 16 24	3427	78 38 10	3416	80 0 8	3405	81 22 19	3394
	α Pegasi	W.	54 56 26	3270	56 21 12	3255	57 46 16	3240	59 11 38	3225
	Saturn	W.	47 29 27	3119	48 57 14	3109	50 25 13	3099	51 53 24	3089
	Pollux	E.	64 48 37	3056	63 19 33	3050	61 50 22	3043	60 21 3	3036
	Regulus	E.	101 41 42	3036	100 12 14	3029	98 42 37	3021	97 12 50	3013
31	Sun	W.	106 34 6	3341	107 57 30	3339	109 21 8	3317	110 45 0	3305
	Fomalhaut	W.	88 16 20	3339	89 39 46	3339	91 3 24	3319	92 27 14	3308
	α Pegasi	W.	66 22 47	3153	67 49 53	3138	69 17 17	3123	70 44 59	3108
	Saturn	W.	59 17 25	3036	60 46 54	3023	62 16 28	3019	63 46 36	3000
	Pollux	E.	52 52 5	2995	51 21 46	2985	49 51 15	2976	48 20 32	2966
	Regulus	E.	89 41 19	2967	88 10 25	2957	86 39 18	2946	85 7 57	2934

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>		<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>s</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	
Sat.	1	20 59 8.92	10.188	S. 17° 6' 59.4	+42.66	16 16.06	68.28	13 49.72	0.331	
Sun.	2	21 3 13.02	10.153	16 49 46.5	43.40	16 15.91	68.16	13 57.24	0.296	
Mon.	3	21 7 16.28	10.118	16 32 16.1	44.12	16 15.76	68.05	14 3.93	0.262	
Tues.	4	21 11 18.72	10.083	16 14 28.5	44.83	16 15.61	67.94	14 9.79	0.227	
Wed.	5	21 15 20.32	10.049	15 56 24.3	45.56	16 15.45	67.82	14 14.83	0.192	
Thur.	6	21 19 21.10	10.015	15 38 3.6	46.19	16 15.28	67.71	14 19.06	0.159	
Frid.	7	21 23 21.08	9.982	15 19 27.1	46.85	16 15.11	67.59	14 22.47	0.126	
Sat.	8	21 27 20.26	9.949	15 0 35.1	47.49	16 14.94	67.48	14 25.08	0.093	
Sun.	9	21 31 18.64	9.917	14 41 27.7	48.12	16 14.76	67.37	14 26.90	0.060	
Mon.	10	21 35 16.26	9.885	14 22 5.5	48.73	16 14.57	67.26	14 27.95	0.028	
Tues.	11	21 39 13.10	9.854	14 2 28.9	49.32	16 14.38	67.14	14 28.24	0.004	
Wed.	12	21 43 9.19	9.823	13 42 38.4	49.89	16 14.18	67.03	14 27.78	0.035	
Thur.	13	21 47 4.54	9.792	13 22 34.2	50.45	16 13.98	66.92	14 26.57	0.066	
Frid.	14	21 50 59.16	9.761	13 2 16.9	50.98	16 13.78	66.81	14 24.63	0.096	
Sat.	15	21 54 53.04	9.731	12 41 46.7	51.51	16 13.57	66.71	14 21.97	0.125	
Sun.	16	21 58 46.20	9.701	12 21 4.3	52.01	16 13.36	66.60	14 18.60	0.155	
Mon.	17	22 2 38.66	9.672	12 0 9.9	52.50	16 13.15	66.50	14 14.53	0.184	
Tues.	18	22 6 30.44	9.643	11 39 4.1	52.97	16 12.93	66.40	14 9.77	0.212	
Wed.	19	22 10 21.55	9.615	11 17 47.1	53.43	16 12.71	66.30	14 4.33	0.240	
Thur.	20	22 14 11.98	9.588	10 56 19.5	53.87	16 12.49	66.20	13 58.22	0.268	
Frid.	21	22 18 1.75	9.561	10 34 41.8	54.27	16 12.27	66.11	13 51.45	0.295	
Sat.	22	22 21 50.87	9.534	10 12 54.3	54.67	16 12.05	66.02	13 44.03	0.322	
Sun.	23	22 25 39.35	9.507	9 50 57.6	55.05	16 11.82	65.93	13 35.98	0.348	
Mon.	24	22 29 27.21	9.481	9 28 52.0	55.41	16 11.60	65.84	13 27.31	0.373	
Tues.	25	22 33 14.46	9.456	9 6 37.9	55.75	16 11.37	65.76	13 18.04	0.398	
Wed.	26	22 37 1.12	9.432	8 44 15.8	56.08	16 11.14	65.67	13 8.17	0.423	
Thur.	27	22 40 47.20	9.408	8 21 46.0	56.39	16 10.91	65.59	12 57.72	0.447	
Frid.	28	22 44 32.70	9.385	7 59 9.1	56.68	16 10.68	65.51	12 46.71	0.470	
Sat.	29	22 48 17.66	9.363	S. 7 36 25.4	+56.95	16 10.44	65.44	12 35.15	0.492	

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.

+ prefixed to the hourly change of declination indicates that south declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Sat.	1	<sup>h</sup> 20 <sup>m</sup> 59 <sup>s</sup> 6.56	10.187	S. 17° 7' 9.2"	+42.65	<sup>m</sup> 13 <sup>s</sup> 49.64	0.331	<sup>h</sup> 20 <sup>m</sup> 45 <sup>s</sup> 16.92
Sun.	2	21 3 10.65	10.152	16 49 56.7	43.39	13 57.17	0.296	20 49 13.48
Mon.	3	21 7 13.90	10.118	16 32 26.5	44.11	14 3.87	0.262	20 53 10.03
Tues.	4	21 11 16.33	10.083	16 14 39.2	44.82	14 9.74	0.227	20 57 6.59
Wed.	5	21 15 17.93	10.049	15 56 35.1	45.51	14 14.79	0.192	21 1 3.14
Thur.	6	21 19 18.71	10.015	15 38 14.7	46.18	14 19.02	0.159	21 4 59.70
Frid.	7	21 23 18.69	9.982	15 19 38.4	46.84	14 22.44	0.126	21 8 56.25
Sat.	8	21 27 17.87	9.949	15 0 46.5	47.48	14 25.06	0.093	21 12 52.81
Sun.	9	21 31 16.25	9.917	14 41 39.3	48.11	14 26.89	0.060	21 16 49.36
Mon.	10	21 35 13.87	9.885	14 22 17.3	48.72	14 27.95	0.028	21 20 45.92
Tues.	11	21 39 10.72	9.854	14 2 40.8	49.31	14 28.24	0.004	21 24 42.48
Wed.	12	21 43 6.82	9.823	13 42 50.4	49.88	14 27.78	0.035	21 28 39.04
Thur.	13	21 47 2.18	9.792	13 22 46.4	50.44	14 26.59	0.066	21 32 35.59
Frid.	14	21 50 56.81	9.762	13 2 29.1	50.98	14 24.66	0.096	21 36 32.15
Sat.	15	21 54 50.71	9.732	12 41 59.1	51.51	14 22.01	0.125	21 40 28.70
Sun.	16	21 58 43.89	9.702	12 21 16.7	52.01	14 18.64	0.155	21 44 25.26
Mon.	17	22 2 36.37	9.673	12 0 22.4	52.50	14 14.57	0.184	21 48 21.80
Tues.	18	22 6 28.17	9.644	11 39 16.6	52.97	14 9.81	0.212	21 52 18.36
Wed.	19	22 10 19.30	9.616	11 17 59.6	53.43	14 4.39	0.240	21 56 14.91
Thur.	20	22 14 9.75	9.589	10 56 32.0	53.87	13 58.28	0.268	22 0 11.47
Frid.	21	22 17 59.54	9.562	10 34 54.3	54.27	13 51.52	0.295	22 4 8.02
Sat.	22	22 21 48.69	9.535	10 13 6.8	54.67	13 44.11	0.322	22 8 4.58
Sun.	23	22 25 37.20	9.508	9 51 10.0	55.05	13 36.07	0.348	22 12 1.13
Mon.	24	22 29 25.09	9.482	9 29 4.3	55.41	13 27.40	0.373	22 15 57.69
Tues.	25	22 33 12.37	9.457	9 6 50.2	55.75	13 18.13	0.398	22 19 54.24
Wed.	26	22 36 59.06	9.433	8 44 28.1	56.08	13 8 26	0.423	22 23 50.80
Thur.	27	22 40 45.17	9.409	8 21 58.2	56.39	12 57.81	0.447	22 27 47.35
Frid.	28	22 44 30.71	9.386	7 59 21.2	56.68	12 46.80	0.470	22 31 43.91
Sat.	29	22 48 15.71	9.364	S. 7 36 37.3	+56.96	12 35.25	0.492	22 35 40.46

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

+ prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 hour.

+ 9°.8565

(Table III.)



AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal $^{\circ}$ .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	32	312 <sup>0</sup> 18' 58.0"	18' 38.0"	152.15	+0.19	9.9986973	+26.5	<sup>h</sup> 3 <sup>m</sup> 14 <sup>s</sup> 11.18	
2	33	313 19 49.0	19 28.9	152.09	+0.09	.9937619	27.4	3 10 15.27	
3	34	314 20 38.5	20 18.3	152.03	-0.01	.9938288	28.4	3 6 19.36	
4	35	315 21 26.6	21 6.3	151.97	0.14	.9938981	29.3	3 2 23.45	
5	36	316 22 13.4	21 52.9	151.92	0.27	.9939697	30.3	2 58 27.54	
6	37	317 22 59.0	22 38.3	151.87	0.41	.9940437	31.3	2 54 31.63	
7	38	318 23 43.3	23 22.5	151.82	0.54	.9941201	32.3	2 50 35.72	
8	39	319 24 26.3	24 5.4	151.77	0.64	.9941988	33.3	2 46 39.81	
9	40	320 25 8.0	24 47.0	151.72	0.73	.9942798	34.2	2 42 43.90	
10	41	321 25 48.6	25 27.4	151.67	0.81	.9943631	35.1	2 38 47.99	
11	42	322 26 28.2	26 6.8	151.62	0.85	.9944485	36.0	2 34 52.08	
12	43	323 27 6.6	26 45.0	151.57	0.86	.9945358	36.8	2 30 56.17	
13	44	324 27 43.6	27 22.0	151.52	0.83	.9946250	37.5	2 27 0.26	
14	45	325 28 19.5	27 57.8	151.47	0.77	.9947160	38.2	2 23 4.35	
15	46	326 28 54.3	28 32.4	151.42	0.71	.9948085	38.8	2 19 8.44	
16	47	327 29 27.8	29 5.8	151.37	0.61	.9949023	39.2	2 15 12.53	
17	48	328 30 0.1	29 38.0	151.32	0.49	.9949973	39.7	2 11 16.63	
18	49	329 30 31.1	30 8.9	151.26	0.35	.9950933	40.1	2 7 20.72	
19	50	330 31 0.7	30 38.4	151.20	0.22	.9951903	40.5	2 3 24.81	
20	51	331 31 28.7	31 6.3	151.13	-0.08	.9952883	40.9	1 59 28.90	
21	52	332 31 55.1	31 32.5	151.06	+0.03	.9953871	41.2	1 55 33.00	
22	53	333 32 19.8	31 57.1	150.99	0.14	.9954866	41.5	1 51 37.09	
23	54	334 32 42.7	32 19.9	150.92	0.23	.9955868	41.8	1 47 41.18	
24	55	335 33 3.8	32 40.9	150.84	0.30	.9956877	42.1	1 43 45.27	
25	56	336 33 23.1	33 0.1	150.76	0.32	.9957894	42.5	1 39 49.36	
26	57	337 33 40.5	33 17.3	150.68	0.31	.9958920	42.9	1 35 53.45	
27	58	338 33 55.8	33 32.4	150.59	0.28	.9959955	43.3	1 31 57.54	
28	59	339 34 8.9	33 45.5	150.51	0.23	.9961001	43.7	1 28 1.63	
29	60	340 34 20.1	33 56.6	150.42	+0.16	9.9962057	+44.2	1 24 5.73	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .									Diff. for 1 hour. — 9 <sup>m</sup> .8996 (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>d</sup>
1	15' 3.2	15' 8.0	55' 7.8	+1.39	55' 25.6	+1.56	7 37.2	2.19	10.0
2	15 13.4	15 19.2	55 45.3	1.70	56 6.6	1.82	8 30.9	2.28	11.0
3	15 25.3	15 31.7	56 29.1	1.91	56 52.5	1.97	9 26.4	2.32	12.0
4	15 38.2	15 44.7	57 16.4	1.98	57 40.2	1.96	10 22.0	2.30	13.0
5	15 51.0	15 57.1	58 3.5	1.90	58 25.7	1.79	11 16.7	2.24	14.0
6	16 2.6	16 7.7	58 46.3	1.64	59 4.9	1.46	12 9.6	2.10	15.0
7	16 12.2	16 15.9	59 21.2	1.25	59 34.8	1.01	13 0.7	2.10	16.0
8	16 18.8	16 20.9	59 45.4	0.76	59 53.0	+0.50	13 50.7	2.07	17.0
9	16 22.0	16 22.4	59 57.5	+0.25	59 58.9	0.00	14 40.5	2.09	18.0
10	16 22.0	16 21.0	59 57.5	-0.23	59 53.4	-0.43	15 31.3	2.15	19.0
11	16 19.2	16 16.9	59 47.0	0.61	59 38.6	0.77	16 24.1	2.25	20.0
12	16 14.1	16 11.0	59 28.4	0.91	59 16.8	1.01	17 19.4	2.37	21.0
13	16 7.5	16 3.9	59 4.2	1.08	58 50.8	1.14	18 17.2	2.45	22.0
14	16 0.1	15 56.1	58 36.7	1.18	58 22.3	1.21	19 16.6	2.48	23.0
15	15 52.1	15 48.1	58 7.6	1.23	57 52.8	1.23	20 15.6	2.42	24.0
16	15 44.0	15 40.0	57 37.9	1.24	57 23.0	1.24	21 12.5	2.30	25.0
17	15 36.0	15 31.9	57 8.1	1.23	56 53.3	1.23	22 5.9	2.44	26.0
18	15 27.9	15 23.9	56 38.5	1.23	56 23.8	1.22	22 55.4	1.98	27.0
19	15 19.9	15 16.1	56 9.3	1.20	55 55.0	1.18	23 41.4	1.85	28.0
20	15 12.2	15 8.5	55 41.0	1.16	55 27.3	1.12	δ		29.0
21	15 4.9	15 1.5	55 14.2	1.07	55 1.7	1.01	0 24.7	1.75	0.3
22	14 58.4	14 55.4	54 50.0	0.93	54 39.3	0.85	1 6.1	1.70	1.3
23	14 52.8	14 50.6	54 29.7	0.75	54 21.4	0.63	1 46.7	1.69	2.3
24	14 48.7	14 47.3	54 14.6	0.50	54 9.6	-0.35	2 27.4	1.71	3.3
25	14 46.5	14 46.1	54 6.4	-0.18	54 5.3	0.00	3 9.1	1.77	4.3
26	14 46.4	14 47.4	54 6.3	+0.18	54 9.7	+0.38	3 52.7	1.87	5.3
27	14 48.9	14 51.2	54 15.5	0.58	54 23.8	0.79	4 38.8	1.98	6.3
28	14 54.1	14 57.8	54 34.6	1.01	54 48.0	1.22	5 27.7	2.10	7.3
29	15 2.1	15 7.1	55 3.9	1.42	55 22.2	1.62	6 19.2	2.20	8.3
30	15 12.7	15 18.9	55 42.8	1.80	56 5.5	1.97	7 12.7	2.26	9.3
31	15 25.6	15 32.7	56 30.1	2.11	56 56.2	2.22	8 7.1	2.27	10.3
32	15 40.1	15 47.7	57 23.4	+2.29	57 51.1	+2.32	9 1.3	2.24	11.3

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 1.					MONDAY 3.				
0	4 6 33.98	2.2377	N.25 32' 10.0"	4.303	0	5 58 25.23	2.3945	N.26 26' 37.8"	2.361
1	4 8 48.39	2.2425	25 36 29.9	4.269	1	6 0 48.94	2.3957	26 24 11.6	2.513
2	4 11 3.08	2.2473	25 40 42.3	4.143	2	6 3 12.72	2.3969	26 21 36.2	2.666
3	4 13 18.05	2.2518	25 44 47.1	4.018	3	6 5 36.57	2.3980	26 18 51.7	2.818
4	4 15 33.30	2.2565	25 48 44.4	3.892	4	6 8 0.48	2.3989	26 15 58.0	2.979
5	4 17 48.83	2.2611	25 52 34.1	3.764	5	6 10 24.44	2.3997	26 12 55.1	3.125
6	4 20 4.63	2.2656	25 56 16.1	3.636	6	6 12 48.44	2.4004	26 9 43.0	3.278
7	4 22 20.70	2.2701	25 59 50.4	3.507	7	6 15 12.49	2.4012	26 6 21.7	3.432
8	4 24 37.04	2.2745	26 3 16.9	3.377	8	6 17 36.58	2.4018	26 2 51.2	3.584
9	4 26 53.64	2.2788	26 6 35.7	3.247	9	6 20 0.70	2.4022	25 59 11.6	3.737
10	4 29 10.50	2.2832	26 9 46.6	3.115	10	6 22 24.84	2.4026	25 55 22.8	3.890
11	4 31 27.62	2.2875	26 12 49.5	2.983	11	6 24 49.01	2.4029	25 51 24.8	4.044
12	4 33 45.00	2.2917	26 15 44.5	2.850	12	6 27 13.19	2.4031	25 47 17.5	4.197
13	4 36 2.63	2.2959	26 18 31.5	2.716	13	6 29 37.38	2.4032	25 43 1.1	4.350
14	4 38 20.51	2.3000	26 21 10.4	2.582	14	6 32 1.57	2.4032	25 38 35.5	4.503
15	4 40 38.63	2.3040	26 23 41.3	2.447	15	6 34 25.76	2.4031	25 34 0.7	4.657
16	4 42 56.99	2.3080	26 26 4.0	2.310	16	6 36 49.94	2.4029	25 29 16.7	4.809
17	4 45 15.59	2.3119	26 28 18.5	2.172	17	6 39 14.11	2.4026	25 24 23.6	4.962
18	4 47 34.42	2.3158	26 30 24.7	2.035	18	6 41 38.25	2.4022	25 19 21.3	5.115
19	4 49 53.48	2.3196	26 32 22.7	1.897	19	6 44 2.37	2.4017	25 14 9.8	5.267
20	4 52 12.77	2.3233	26 34 12.3	1.758	20	6 46 26.46	2.4012	25 8 49.3	5.418
21	4 54 32.28	2.3270	26 35 53.6	1.618	21	6 48 50.52	2.4007	25 3 19.7	5.569
22	4 56 52.01	2.3308	26 37 26.5	1.478	22	6 51 14.54	2.4000	24 57 41.0	5.721
23	4 59 11.95	2.3340	N.26 38 50.9	1.337	23	6 53 38.52	2.3992	N.24 51 53.2	5.873
SUNDAY 2.					TUESDAY 4.				
0	5 1 32.09	2.3374	N.26 40 6.9	1.196	0	6 56 2.44	2.3983	N.24 45 56.3	6.023
1	5 3 52.44	2.3408	26 41 14.4	1.053	1	6 58 26.31	2.3973	24 39 50.4	6.173
2	5 6 12.99	2.3441	26 42 13.3	0.909	2	7 0 50.12	2.3963	24 33 35.5	6.323
3	5 8 33.73	2.3473	26 43 3.5	0.765	3	7 3 13.86	2.3952	24 27 11.6	6.473
4	5 10 54.66	2.3504	26 43 45.1	0.621	4	7 5 37.54	2.3940	24 20 38.8	6.623
5	5 13 15.78	2.3535	26 44 18.0	0.477	5	7 8 1.14	2.3927	24 13 57.0	6.771
6	5 15 37.08	2.3565	26 44 42.3	0.333	6	7 10 24.66	2.3913	24 7 6.3	6.919
7	5 17 58.56	2.3593	26 44 57.8	0.185	7	7 12 48.10	2.3899	24 0 6.7	7.067
8	5 20 20.20	2.3620	26 45 4.5	+0.039	8	7 15 11.45	2.3884	23 52 58.3	7.213
9	5 22 42.00	2.3647	26 45 2.5	-0.108	9	7 17 34.71	2.3869	23 45 41.1	7.360
10	5 25 3.96	2.3673	26 44 51.6	0.255	10	7 19 57.88	2.3852	23 38 15.1	7.506
11	5 27 26.08	2.3699	26 44 31.9	0.403	11	7 22 20.94	2.3835	23 30 40.4	7.651
12	5 29 48.35	2.3723	26 44 3.3	0.552	12	7 24 43.90	2.3817	23 22 57.0	7.796
13	5 32 10.76	2.3747	26 43 25.7	0.701	13	7 27 6.75	2.3799	23 15 4.9	7.940
14	5 34 33.31	2.3770	26 42 39.2	0.849	14	7 29 29.49	2.3780	23 7 4.2	8.084
15	5 36 56.00	2.3792	26 41 43.8	0.998	15	7 31 52.11	2.3760	22 58 54.8	8.227
16	5 39 18.81	2.3812	26 40 39.4	1.149	16	7 34 14.61	2.3740	22 50 36.9	8.369
17	5 41 41.74	2.3832	26 39 25.9	1.300	17	7 36 36.99	2.3720	22 42 10.5	8.510
18	5 44 4.79	2.3851	26 38 3.4	1.450	18	7 38 59.25	2.3698	22 33 35.7	8.651
19	5 46 27.95	2.3869	26 36 31.9	1.601	19	7 41 21.37	2.3676	22 24 52.4	8.791
20	5 48 51.22	2.3887	26 34 51.3	1.752	20	7 43 43.36	2.3653	22 16 0.8	8.930
21	5 51 14.59	2.3903	26 33 1.6	1.904	21	7 46 5.21	2.3630	22 7 0.8	9.068
22	5 53 38.05	2.3918	26 31 2.8	2.056	22	7 48 26.92	2.3607	21 57 52.6	9.205
23	5 56 1.60	2.3932	26 28 54.9	2.208	23	7 50 48.49	2.3583	21 48 36.2	9.342
24	5 58 25.23	2.3945	N.26 26 37.8	2.361	24	7 53 9.92	2.3559	N.21 39 11.5	9.479

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 5.					FRIDAY 7.				
0	<sup>h</sup> 7 <sup>m</sup> 53 <sup>s</sup> 9.92	2.3559	N. 21° 39' 11.5"	9.479	0	<sup>h</sup> 9 <sup>m</sup> 43 <sup>s</sup> 1.64	2.2922	N. 11° 48' 36.7"	14.641
1	7 55 31.20	2.3534	21 29 38.7	9.613	1	9 45 14.90	2.2918	11 33 56.0	14.714
2	7 57 52.33	2.3508	21 19 57.9	9.747	2	9 47 28.02	2.2914	11 19 11.0	14.786
3	8 0 13.30	2.3483	21 10 9.1	9.879	3	9 49 40.99	2.2910	11 4 21.7	14.857
4	8 2 34.12	2.3457	21 0 12.4	10.012	4	9 51 53.82	2.2918	10 49 28.2	14.926
5	8 4 54.78	2.3430	20 50 7.7	10.143	5	9 54 6.52	2.2916	10 34 30.6	14.993
6	8 7 15.28	2.3403	20 39 55.2	10.273	6	9 56 19.09	2.2904	10 19 29.0	15.059
7	8 9 35.62	2.3377	20 29 34.9	10.402	7	9 58 31.53	2.2902	10 4 23.5	15.124
8	8 11 55.80	2.3349	20 19 6.9	10.530	8	10 0 43.84	2.2901	9 49 14.1	15.187
9	8 14 15.81	2.3322	20 8 31.3	10.658	9	10 2 56.02	2.2900	9 34 1.0	15.249
10	8 16 35.66	2.3294	19 57 48.0	10.784	10	10 5 8.08	2.2900	9 18 44.2	15.309
11	8 18 55.34	2.3266	19 46 57.2	10.908	11	10 7 20.02	2.2901	9 3 23.9	15.367
12	8 21 14.85	2.3237	19 35 59.0	11.032	12	10 9 31.85	2.2902	8 48 0.2	15.423
13	8 23 34.19	2.3209	19 24 53.4	11.155	13	10 11 43.57	2.2904	8 32 33.1	15.478
14	8 25 53.36	2.3180	19 13 40.4	11.277	14	10 13 55.18	2.2925	8 17 2.8	15.532
15	8 28 12.35	2.3151	19 2 20.2	11.397	15	10 16 6.67	2.2907	8 1 29.3	15.584
16	8 30 31.17	2.3122	18 50 52.8	11.516	16	10 18 18.06	2.2891	7 45 52.7	15.634
17	8 32 49.81	2.3092	18 39 18.3	11.634	17	10 20 29.36	2.2875	7 30 13.2	15.682
18	8 35 8.28	2.3063	18 27 36.7	11.751	18	10 22 40.56	2.2859	7 14 30.8	15.730
19	8 37 26.57	2.3034	18 15 48.2	11.867	19	10 24 51.67	2.2844	6 58 45.6	15.776
20	8 39 44.69	2.3005	18 3 52.7	11.982	20	10 27 2.69	2.2829	6 42 57.7	15.819
21	8 42 2.63	2.2975	17 51 50.4	12.095	21	10 29 13.62	2.2815	6 27 7.3	15.861
22	8 44 20.39	2.2946	17 39 41.3	12.207	22	10 31 24.47	2.2802	6 11 14.4	15.902
23	8 46 37.98	2.2917	N. 17° 27' 25.6"	12.317	23	10 33 35.24	2.2789	N. 5° 55' 19.1"	15.940
THURSDAY 6.					SATURDAY 8.				
0	8 48 55.39	2.2887	N. 17° 15' 3.3"	12.426	0	10 35 45.94	2.2777	N. 5° 39' 21.6"	15.977
1	8 51 12.62	2.2857	17 2 34.5	12.534	1	10 37 56.57	2.2766	5 23 21.9	16.013
2	8 53 29.67	2.2827	16 49 59.2	12.642	2	10 40 7.13	2.2754	5 7 20.1	16.047
3	8 55 46.55	2.2798	16 37 17.5	12.748	3	10 42 17.62	2.2744	4 51 16.3	16.079
4	8 58 3.25	2.2768	16 24 29.5	12.852	4	10 44 28.06	2.2735	4 35 10.6	16.110
5	9 0 19.77	2.2739	16 11 35.3	12.954	5	10 46 38.44	2.2726	4 19 3.1	16.138
6	9 2 36.12	2.2710	15 58 35.0	13.056	6	10 48 48.77	2.2717	4 2 54.0	16.165
7	9 4 52.29	2.2681	15 45 28.6	13.156	7	10 50 59.05	2.2710	3 46 43.3	16.192
8	9 7 8.29	2.2652	15 32 16.3	13.254	8	10 53 9.29	2.2703	3 30 31.0	16.216
9	9 9 24.11	2.2622	15 18 58.1	13.352	9	10 55 19.49	2.2697	3 14 17.4	16.238
10	9 11 39.76	2.2594	15 5 34.1	13.448	10	10 57 29.65	2.2691	2 58 2.5	16.258
11	9 13 55.24	2.2567	14 52 4.3	13.543	11	10 59 39.78	2.2686	2 41 46.4	16.277
12	9 16 10.56	2.2539	14 38 28.9	13.636	12	11 1 49.88	2.2682	2 25 29.3	16.294
13	9 18 25.71	2.2511	14 24 48.0	13.727	13	11 3 59.96	2.2678	2 9 11.2	16.310
14	9 20 40.69	2.2482	14 11 1.6	13.818	14	11 6 10.02	2.2675	1 52 52.1	16.325
15	9 22 55.49	2.2454	13 57 9.8	13.907	15	11 8 20.06	2.2673	1 36 32.2	16.337
16	9 25 10.13	2.2427	13 43 12.8	13.994	16	11 10 30.09	2.2672	1 20 11.7	16.347
17	9 27 24.62	2.2402	13 29 10.6	14.080	17	11 12 40.12	2.2672	1 3 50.6	16.356
18	9 29 38.95	2.2385	13 15 3.2	14.165	18	11 14 50.15	2.2672	0 47 29.0	16.363
19	9 31 53.12	2.2348	13 0 50.8	14.247	19	11 17 0.18	2.2672	0 31 7.0	16.369
20	9 34 7.13	2.2322	12 46 33.5	14.328	20	11 19 10.21	2.2673	N. 0° 14' 44.7"	16.372
21	9 36 20.98	2.2296	12 32 11.4	14.408	21	11 21 20.25	2.2675	S. 0° 1' 37.7"	16.374
22	9 38 34.68	2.2271	12 17 44.5	14.487	22	11 23 30.31	2.2677	0 18 0.2	16.375
23	9 40 48.23	2.2247	12 3 12.9	14.565	23	11 25 40.38	2.2680	0 34 22.7	16.375
24	9 43 1.64	2.2222	N. 11° 48' 36.7"	14.641	24	11 27 50.47	2.2684	S. 0° 50' 45.2"	16.373

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 9.					TUESDAY 11.				
0	11 27 50.47	2.1684	S. 0° 50' 45.2"	16.373	0	13 13 44.72	2.2603	S. 13° 22' 1.7"	14.309
1	11 30 0.59	2.1690	1 7 7.5	16.368	1	13 16 0.99	2.2730	13 36 17.4	14.281
2	11 32 10.75	2.1696	1 23 29.4	16.361	2	13 18 17.48	2.2766	13 50 28.2	14.137
3	11 34 20.94	2.1702	1 39 50.8	16.353	3	13 20 34.18	2.2803	14 4 33.8	14.050
4	11 36 31.17	2.1708	1 56 11.7	16.344	4	13 22 51.10	2.2839	14 18 34.2	13.963
5	11 38 41.45	2.1717	2 12 32.1	16.334	5	13 25 8.25	2.2877	14 32 29.4	13.875
6	11 40 51.78	2.1726	2 28 51.8	16.329	6	13 27 25.62	2.2914	14 46 19.2	13.784
7	11 43 2.16	2.1735	2 45 10.7	16.307	7	13 29 43.22	2.2953	15 0 3.5	13.699
8	11 45 12.60	2.1744	3 1 28.6	16.290	8	13 32 1.05	2.2993	15 13 42.3	13.569
9	11 47 23.09	2.1754	3 17 45.5	16.272	9	13 34 19.12	2.3031	15 27 15.4	13.504
10	11 49 33.65	2.1766	3 34 1.3	16.253	10	13 36 37.42	2.3070	15 40 42.8	13.406
11	11 51 44.29	2.1779	3 50 15.9	16.232	11	13 38 55.96	2.3109	15 54 4.4	13.310
12	11 53 55.00	2.1792	4 6 29.2	16.210	12	13 41 14.73	2.3148	16 7 20.0	13.210
13	11 56 5.79	2.1805	4 22 41.1	16.186	13	13 43 33.74	2.3189	16 20 29.6	13.109
14	11 58 16.66	2.1819	4 38 51.5	16.159	14	13 45 53.00	2.3230	16 33 33.1	13.007
15	12 0 27.62	2.1834	4 55 0.2	16.131	15	13 48 12.50	2.3271	16 46 30.5	12.904
16	12 2 38.67	2.1849	5 11 7.2	16.109	16	13 50 32.25	2.3319	16 59 21.6	12.796
17	12 4 49.81	2.1866	5 27 12.4	16.079	17	13 52 52.24	2.3359	17 12 6.3	12.692
18	12 7 1.06	2.1884	5 43 15.8	16.040	18	13 55 12.48	2.3394	17 24 44.6	12.583
19	12 9 12.42	2.1909	5 59 17.2	16.005	19	13 57 32.97	2.3436	17 37 16.3	12.473
20	12 11 23.88	2.1919	6 15 16.4	15.968	20	13 59 53.71	2.3477	17 49 41.4	12.369
21	12 13 35.45	2.1938	6 31 13.4	15.931	21	14 2 14.70	2.3519	18 1 59.8	12.250
22	12 15 47.14	2.1958	6 47 8.1	15.892	22	14 4 35.94	2.3561	18 14 11.4	12.136
23	12 17 58.95	2.1978	S. 7 3 0.4	15.851	23	14 6 57.43	2.3603	S. 18 26 16.1	12.021
MONDAY 10.					WEDNESDAY 12.				
0	12 20 10.88	2.1999	S. 7 18 50.2	15.806	0	14 9 19.17	2.3645	S. 18 38 13.9	11.904
1	12 22 22.94	2.2029	7 34 37.4	15.764	1	14 11 41.17	2.3687	18 50 4.6	11.786
2	12 24 35.14	2.2044	7 50 21.9	15.718	2	14 14 3.42	2.3729	19 1 48.2	11.667
3	12 26 47.47	2.2067	8 6 3.6	15.671	3	14 16 25.92	2.3779	19 13 24.6	11.546
4	12 28 59.94	2.2091	8 21 42.4	15.622	4	14 18 48.68	2.3814	19 24 53.7	11.423
5	12 31 12.56	2.2116	8 37 18.3	15.571	5	14 21 11.69	2.3857	19 36 15.4	11.299
6	12 33 25.33	2.2141	8 52 51.0	15.518	6	14 23 34.96	2.3899	19 47 29.6	11.174
7	12 35 38.25	2.2167	9 8 20.5	15.465	7	14 25 58.48	2.3941	19 58 36.3	11.048
8	12 37 51.33	2.2192	9 23 46.8	15.410	8	14 28 22.25	2.3982	20 9 35.4	10.921
9	12 40 4.56	2.2218	9 39 9.7	15.352	9	14 30 46.27	2.4024	20 20 26.8	10.792
10	12 42 17.95	2.2247	9 54 29.1	15.293	10	14 33 10.54	2.4066	20 31 10.4	10.669
11	12 44 31.52	2.2276	10 9 44.9	15.233	11	14 35 35.06	2.4108	20 41 46.2	10.530
12	12 46 45.26	2.2305	10 24 57.1	15.172	12	14 37 59.84	2.4150	20 52 14.0	10.397
13	12 48 59.18	2.2334	10 40 5.5	15.108	13	14 40 24.86	2.4191	21 2 33.8	10.263
14	12 51 13.27	2.2363	10 55 10.0	15.043	14	14 42 50.13	2.4232	21 12 45.6	10.129
15	12 53 27.54	2.2394	11 10 10.6	14.976	15	14 45 15.64	2.4272	21 22 49.3	9.992
16	12 55 42.00	2.2426	11 25 7.1	14.907	16	14 47 41.39	2.4313	21 32 44.7	9.854
17	12 57 56.65	2.2457	11 39 59.5	14.837	17	14 50 7.39	2.4353	21 42 31.8	9.716
18	13 0 11.48	2.2489	11 54 47.6	14.766	18	14 52 33.63	2.4393	21 52 10.6	9.576
19	13 2 26.51	2.2522	12 9 31.4	14.692	19	14 55 0.11	2.4433	22 1 40.9	9.434
20	13 4 41.74	2.2556	12 24 10.7	14.618	20	14 57 26.82	2.4471	22 11 2.7	9.292
21	13 6 57.18	2.2590	12 38 45.5	14.542	21	14 59 53.76	2.4509	22 20 16.0	9.150
22	13 9 12.82	2.2624	12 53 15.7	14.463	22	15 2 20.93	2.4548	22 29 20.7	9.005
23	13 11 28.67	2.2658	13 7 41.1	14.383	23	15 4 48.33	2.4586	22 38 16.6	8.858
24	13 13 44.72	2.2693	S. 13 22 1.7	14.309	24	15 7 15.96	2.4623	S. 22 47 3.7	8.712

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 13.					SATURDAY 15.				
0	15 7 15.96	2.4623	S. 22° 47' 3.7"	8.719	0	17 8 17.22	2.5417	S. 26° 41' 12.0"	0.855
1	15 9 43.81	2.4660	22 55 42.0	8.565	1	17 10 49.60	2.5406	26 41 58.2	0.685
2	15 12 11.88	2.4696	23 4 11.5	8.417	2	17 13 22.09	2.5393	26 42 34.2	0.516
3	15 14 40.16	2.4732	23 12 32.0	8.267	3	17 15 54.41	2.5379	26 43 0.1	0.347
4	15 17 8.66	2.4767	23 20 43.5	8.116	4	17 18 26.64	2.5365	26 43 15.8	0.177
5	15 19 37.36	2.4801	23 28 45.9	7.963	5	17 20 58.79	2.5350	26 43 21.3	-0.007
6	15 22 6.27	2.4835	23 36 39.1	7.811	6	17 23 30.84	2.5333	26 43 16.7	+0.161
7	15 24 35.38	2.4868	23 44 23.2	7.658	7	17 26 2.78	2.5314	26 43 2.0	0.299
8	15 27 4.69	2.4901	23 51 58.1	7.503	8	17 28 34.61	2.5295	26 42 37.2	0.497
9	15 29 34.19	2.4932	23 59 23.6	7.348	9	17 31 6.32	2.5274	26 42 2.4	0.664
10	15 32 3.88	2.4963	24 6 39.8	7.192	10	17 33 37.90	2.5259	26 41 17.5	0.839
11	15 34 33.75	2.4994	24 13 46.6	7.035	11	17 36 9.35	2.5230	26 40 22.6	0.998
12	15 37 3.81	2.5024	24 20 44.0	6.877	12	17 38 40.66	2.5206	26 39 17.7	1.164
13	15 39 34.04	2.5059	24 27 31.9	6.718	13	17 41 11.82	2.5180	26 38 2.9	1.329
14	15 42 4.44	2.5089	24 34 10.2	6.558	14	17 43 42.82	2.5152	26 36 38.2	1.495
15	15 44 35.00	2.5107	24 40 38.9	6.398	15	17 46 13.65	2.5124	26 35 3.5	1.660
16	15 47 5.73	2.5134	24 46 58.0	6.237	16	17 48 44.31	2.5096	26 33 19.0	1.823
17	15 49 36.61	2.5159	24 53 7.4	6.075	17	17 51 14.80	2.5067	26 31 24.7	1.987
18	15 52 7.64	2.5183	24 59 7.0	5.913	18	17 53 45.11	2.5036	26 29 20.6	2.149
19	15 54 38.81	2.5207	25 4 56.9	5.750	19	17 56 15.23	2.5003	26 27 6.8	2.311
20	15 57 10.13	2.5231	25 10 37.0	5.586	20	17 58 45.15	2.4969	26 24 43.3	2.472
21	15 59 41.58	2.5259	25 16 7.2	5.422	21	18 1 14.86	2.4934	26 22 10.1	2.633
22	16 2 13.15	2.5279	25 21 27.6	5.257	22	18 3 44.36	2.4899	26 19 27.3	2.793
23	16 4 44.84	2.5299	S. 25° 26' 38.1"	5.092	23	18 6 13.65	2.4863	S. 26° 16' 35.0"	2.952
FRIDAY 14.					SUNDAY 16.				
0	16 7 16.65	2.5311	S. 25° 31' 38.6"	4.928	0	18 8 42.72	2.4896	S. 26° 13' 33.1"	3.111
1	16 9 48.57	2.5338	25 36 29.2	4.759	1	18 11 11.56	2.4787	26 10 21.7	3.267
2	16 12 20.59	2.5344	25 41 9.7	4.592	2	18 13 40.17	2.4747	26 7 1.0	3.423
3	16 14 52.70	2.5359	25 45 40.2	4.424	3	18 16 8.53	2.4706	26 3 30.9	3.579
4	16 17 24.90	2.5374	25 50 0.6	4.256	4	18 18 36.64	2.4665	25 59 51.5	3.734
5	16 19 57.19	2.5388	25 54 10.9	4.088	5	18 21 4.51	2.4623	25 56 2.8	3.888
6	16 22 29.56	2.5401	25 58 11.2	3.920	6	18 23 32.12	2.4580	25 52 4.9	4.041
7	16 25 2.00	2.5419	26 2 1.3	3.751	7	18 25 59.47	2.4536	25 47 57.9	4.192
8	16 27 34.50	2.5431	26 5 41.3	3.582	8	18 28 26.55	2.4490	25 43 41.8	4.343
9	16 30 7.05	2.5439	26 9 11.1	3.412	9	18 30 53.35	2.4443	25 39 16.6	4.494
10	16 32 39.65	2.5437	26 12 30.7	3.242	10	18 33 19.87	2.4397	25 34 42.5	4.643
11	16 35 12.30	2.5444	26 15 40.1	3.072	11	18 35 46.12	2.4351	25 29 59.4	4.791
12	16 37 44.98	2.5449	26 18 39.4	2.902	12	18 38 12.08	2.4303	25 25 7.5	4.938
13	16 40 17.69	2.5453	26 21 28.4	2.732	13	18 40 37.74	2.4259	25 20 6.8	5.085
14	16 42 50.42	2.5456	26 24 7.2	2.562	14	18 43 3.10	2.4209	25 14 57.3	5.230
15	16 45 23.16	2.5457	26 26 35.8	2.391	15	18 45 28.17	2.4159	25 9 30.2	5.373
16	16 47 55.91	2.5458	26 28 54.1	2.220	16	18 47 52.93	2.4101	25 4 12.5	5.516
17	16 50 28.66	2.5457	26 31 2.2	2.049	17	18 50 17.38	2.4049	24 58 37.3	5.657
18	16 53 1.40	2.5456	26 33 0.0	1.878	18	18 52 41.52	2.3997	24 52 53.6	5.796
19	16 55 34.13	2.5459	26 34 47.6	1.707	19	18 55 5.34	2.3943	24 47 1.5	5.937
20	16 58 6.83	2.5447	26 36 24.9	1.537	20	18 57 28.84	2.3890	24 41 1.1	6.076
21	17 0 39.49	2.5440	26 37 52.0	1.367	21	18 59 52.02	2.3836	24 34 52.4	6.214
22	17 3 12.11	2.5433	26 39 8.9	1.197	22	19 2 14.87	2.3781	24 28 35.4	6.350
23	17 5 44.69	2.5426	26 40 15.6	1.026	23	19 4 37.39	2.3725	24 22 10.4	6.484
24	17 8 17.22	2.5417	S. 26° 41' 12.0"	0.855	24	19 6 59.57	2.3669	S. 24° 15' 37.4"	0.617

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 17.					WEDNESDAY 19.				
0	19 6 59.57	2.3689	S. 24 15 37.4	6.617	0	20 53 44.21	2.0815	S. 16 48 22.3	11.515
1	19 9 21.42	2.3613	24 8 56.4	6.750	1	20 55 48.93	2.0759	16 36 49.3	11.584
2	19 11 42.93	2.3556	24 2 7.4	6.883	2	20 57 53.32	2.0704	16 25 12.2	11.653
3	19 14 4.09	2.3498	23 55 10.6	7.019	3	20 59 57.38	2.0649	16 13 30.9	11.722
4	19 16 24.91	2.3441	23 48 6.0	7.140	4	21 2 1.11	2.0595	16 1 45.6	11.788
5	19 18 45.38	2.3383	23 40 53.8	7.267	5	21 4 4.52	2.0542	15 49 56.4	11.853
6	19 21 5.51	2.3325	23 33 34.0	7.393	6	21 6 7.61	2.0488	15 38 3.3	11.917
7	19 23 25.28	2.3266	23 26 6.6	7.518	7	21 8 10.38	2.0435	15 26 6.4	11.979
8	19 25 44.70	2.3207	23 18 31.8	7.642	8	21 10 12.83	2.0382	15 14 5.8	12.040
9	19 28 3.76	2.3147	23 10 49.6	7.764	9	21 12 14.96	2.0329	15 2 1.6	12.100
10	19 30 22.46	2.3087	23 3 0.1	7.886	10	21 14 16.78	2.0278	14 49 53.8	12.159
11	19 32 40.81	2.3028	22 55 3.3	8.006	11	21 16 18.30	2.0228	14 37 42.5	12.217
12	19 34 58.80	2.2968	22 46 59.4	8.124	12	21 18 19.52	2.0177	14 25 27.8	12.273
13	19 37 16.43	2.2907	22 38 48.5	8.241	13	21 20 20.43	2.0127	14 13 9.8	12.328
14	19 39 33.69	2.2847	22 30 30.5	8.357	14	21 22 21.04	2.0077	14 0 48.4	12.383
15	19 41 50.59	2.2786	22 22 5.6	8.473	15	21 24 21.35	2.0027	13 48 23.8	12.437
16	19 44 7.12	2.2725	22 13 33.9	8.585	16	21 26 21.37	1.9979	13 35 56.0	12.488
17	19 46 23.29	2.2664	22 4 55.4	8.697	17	21 28 21.10	1.9930	13 23 25.2	12.538
18	19 48 39.09	2.2603	21 56 10.2	8.808	18	21 30 20.55	1.9884	13 10 51.4	12.588
19	19 50 54.52	2.2542	21 47 18.4	8.917	19	21 32 19.71	1.9837	12 58 14.6	12.637
20	19 53 9.59	2.2481	21 38 20.1	9.025	20	21 34 18.59	1.9790	12 45 35.0	12.683
21	19 55 24.29	2.2419	21 29 15.4	9.130	21	21 36 17.19	1.9744	12 32 52.6	12.729
22	19 57 38.62	2.2358	21 20 4.3	9.237	22	21 38 15.52	1.9699	12 20 7.5	12.774
23	19 59 52.59	2.2297	S. 21 10 46.9	9.349	23	21 40 13.58	1.9653	S. 12 7 19.7	12.817
TUESDAY 18.					THURSDAY 20.				
0	20 2 6.19	2.2236	S. 21 1 23.3	9.444	0	21 42 11.36	1.9608	S. 11 54 29.4	12.859
1	20 4 19.42	2.2174	20 51 53.6	9.546	1	21 44 8.88	1.9565	11 41 36.6	12.901
2	20 6 32.28	2.2113	20 42 17.8	9.646	2	21 46 6.14	1.9522	11 28 41.3	12.942
3	20 8 44.78	2.2052	20 32 36.1	9.744	3	21 48 3.15	1.9480	11 15 43.5	12.982
4	20 10 56.91	2.1991	20 22 48.5	9.842	4	21 49 59.90	1.9438	11 2 43.4	13.020
5	20 13 8.67	2.1930	20 12 55.1	9.938	5	21 51 56.41	1.9397	10 49 41.1	13.057
6	20 15 20.07	2.1869	20 2 55.9	10.033	6	21 53 52.67	1.9356	10 36 36.6	13.093
7	20 17 31.10	2.1808	19 52 51.1	10.127	7	21 55 48.68	1.9315	10 23 29.9	13.128
8	20 19 41.77	2.1748	19 42 40.7	10.218	8	21 57 44.46	1.9277	10 10 21.2	13.163
9	20 21 52.08	2.1688	19 32 24.9	10.308	9	21 59 40.00	1.9238	9 57 10.5	13.194
10	20 24 2.03	2.1628	19 22 3.7	10.398	10	22 1 35.31	1.9199	9 43 57.9	13.226
11	20 26 11.62	2.1568	19 11 37.1	10.487	11	22 3 30.39	1.9162	9 30 43.4	13.257
12	20 28 20.85	2.1508	19 1 5.3	10.573	12	22 5 25.25	1.9125	9 17 27.1	13.288
13	20 30 29.72	2.1449	18 50 28.3	10.659	13	22 7 19.89	1.9088	9 4 9.1	13.314
14	20 32 38.24	2.1390	18 39 46.2	10.743	14	22 9 14.31	1.9052	8 50 49.4	13.342
15	20 34 46.40	2.1331	18 28 59.1	10.826	15	22 11 8.51	1.9016	8 37 28.0	13.368
16	20 36 54.21	2.1272	18 18 7.1	10.907	16	22 13 2.50	1.8982	8 24 5.1	13.394
17	20 39 1.67	2.1214	18 7 10.2	10.988	17	22 14 56.29	1.8947	8 10 40.7	13.419
18	20 41 8.78	2.1156	17 56 8.5	11.067	18	22 16 49.87	1.8913	7 57 14.8	13.442
19	20 43 15.54	2.1098	17 45 2.1	11.145	19	22 18 43.25	1.8881	7 43 47.6	13.464
20	20 45 21.96	2.1041	17 33 51.1	11.222	20	22 20 36.44	1.8849	7 30 19.1	13.486
21	20 47 28.03	2.0983	17 22 35.5	11.297	21	22 22 29.44	1.8818	7 16 49.3	13.507
22	20 49 33.76	2.0927	17 11 15.5	11.370	22	22 24 22.25	1.8787	7 3 18.3	13.528
23	20 51 39.15	2.0871	16 59 51.1	11.443	23	22 26 14.88	1.8756	6 49 46.2	13.544
24	20 53 44.21	2.0815	S. 16 48 22.3	11.515	24	22 28 7.32	1.8726	S. 6 36 13.0	13.558

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 21.					SUNDAY 23.				
0	<sup>h</sup> 22 <sup>m</sup> 28 <sup>s</sup> 7.32	1.8796	S. 6° 36' 13.0	13.569	0	<sup>h</sup> 23 <sup>m</sup> 55 <sup>s</sup> 47.88	1.8050	N. 4° 17' 55.4	13.379
1	22 29 59.59	1.8807	6 22 38.8	13.578	1	23 57 36.18	1.8051	4 31 17.0	13.349
2	22 31 51.69	1.8809	6 9 3.6	13.594	2	23 59 24.49	1.8052	4 44 37.2	13.325
3	22 33 43.62	1.8849	5 55 27.5	13.608	3	0 1 12.81	1.8055	4 57 56.0	13.300
4	22 35 35.39	1.8614	5 41 50.6	13.629	4	0 3 1.15	1.8058	5 11 13.2	13.973
5	22 37 26.99	1.8587	5 28 12.8	13.636	5	0 4 49.51	1.8062	5 24 28.8	13.947
6	22 39 18.43	1.8561	5 14 34.3	13.647	6	0 6 37.90	1.8067	5 37 42.8	13.919
7	22 41 9.72	1.8536	5 0 55.2	13.658	7	0 8 26.31	1.8079	5 50 55.1	13.191
8	22 43 0.86	1.8519	4 47 15.4	13.668	8	0 10 14.76	1.8077	6 4 5.7	13.162
9	22 44 51.86	1.8488	4 33 35.0	13.677	9	0 12 3.24	1.8083	6 17 14.6	13.133
10	22 46 42.72	1.8465	4 19 54.1	13.686	10	0 13 51.76	1.8090	6 30 21.7	13.103
11	22 48 33.44	1.8449	4 6 12.7	13.693	11	0 15 40.32	1.8098	6 43 26.9	13.079
12	22 50 24.02	1.8419	3 52 30.9	13.699	12	0 17 28.93	1.8106	6 56 30.3	13.041
13	22 52 14.47	1.8396	3 38 48.8	13.705	13	0 19 17.59	1.8114	7 9 31.8	13.008
14	22 54 4.80	1.8377	3 25 6.3	13.710	14	0 21 6.30	1.8123	7 22 31.3	12.974
15	22 55 55.00	1.8357	3 11 23.6	13.713	15	0 22 55.07	1.8133	7 35 28.7	12.940
16	22 57 45.08	1.8338	2 57 40.7	13.716	16	0 24 43.90	1.8143	7 48 24.1	12.906
17	22 59 35.05	1.8319	2 43 57.7	13.718	17	0 26 32.79	1.8154	8 1 17.4	12.871
18	23 1 24.91	1.8301	2 30 14.6	13.719	18	0 28 21.75	1.8166	8 14 8.6	12.835
19	23 3 14.66	1.8283	2 16 31.4	13.719	19	0 30 10.78	1.8178	8 26 57.6	12.798
20	23 5 4.31	1.8266	2 2 48.3	13.718	20	0 31 59.89	1.8191	8 39 44.4	12.761
21	23 6 53.85	1.8249	1 49 5.2	13.717	21	0 33 49.07	1.8203	8 52 28.9	12.729
22	23 8 43.30	1.8234	1 35 22.2	13.715	22	0 35 38.33	1.8217	9 5 11.1	12.683
23	23 10 32.66	1.8219	S. 1° 21' 39.4	13.719	23	0 37 27.68	1.8232	N. 9° 17' 50.9	12.644
SATURDAY 22.					MONDAY 24.				
0	23 12 21.93	1.8204	S. 1° 7' 56.8	13.708	0	0 39 17.12	1.8247	N. 9° 30' 28.4	12.604
1	23 14 11.11	1.8191	0 54 14.5	13.703	1	0 41 6.65	1.8263	9 43 3.4	12.563
2	23 16 0.22	1.8178	0 40 32.5	13.698	2	0 42 56.28	1.8279	9 55 35.9	12.521
3	23 17 49.25	1.8165	0 26 50.8	13.693	3	0 44 46.00	1.8295	10 8 5.9	12.478
4	23 19 38.20	1.8153	S. 0° 13' 9.5	13.684	4	0 46 35.82	1.8313	10 20 33.3	12.435
5	23 21 27.09	1.8142	N. 0° 0' 31.3	13.678	5	0 48 25.75	1.8331	10 32 58.1	12.392
6	23 23 15.91	1.8132	0 14 11.6	13.667	6	0 50 15.79	1.8349	10 45 20.3	12.347
7	23 25 4.67	1.8122	0 27 51.3	13.657	7	0 52 5.94	1.8368	10 57 39.8	12.302
8	23 26 53.37	1.8119	0 41 30.4	13.647	8	0 53 56.21	1.8387	11 9 56.5	12.256
9	23 28 42.02	1.8104	0 55 8.9	13.636	9	0 55 46.59	1.8407	11 22 10.5	12.209
10	23 30 30.62	1.8097	1 8 46.7	13.623	10	0 57 37.09	1.8428	11 34 21.6	12.161
11	23 32 19.18	1.8089	1 22 23.7	13.610	11	0 59 27.72	1.8449	11 46 29.8	12.113
12	23 34 7.69	1.8082	1 35 59.9	13.597	12	1 1 18.48	1.8471	11 58 35.2	12.065
13	23 35 56.16	1.8076	1 49 35.3	13.583	13	1 3 9.37	1.8493	12 10 37.6	12.015
14	23 37 44.60	1.8071	2 3 9.8	13.567	14	1 5 0.40	1.8516	12 22 37.0	11.965
15	23 39 33.01	1.8066	2 16 43.3	13.550	15	1 6 51.56	1.8538	12 34 33.4	11.914
16	23 41 21.39	1.8062	2 30 15.8	13.533	16	1 8 42.86	1.8562	12 46 26.7	11.862
17	23 43 9.75	1.8058	2 43 47.3	13.516	17	1 10 34.31	1.8587	12 58 16.9	11.810
18	23 44 58.06	1.8054	2 57 17.8	13.498	18	1 12 25.91	1.8619	13 10 3.9	11.757
19	23 46 46.39	1.8052	3 10 47.1	13.479	19	1 14 17.66	1.8637	13 21 47.7	11.703
20	23 48 34.70	1.8051	3 24 15.3	13.460	20	1 16 9.56	1.8662	13 33 28.2	11.648
21	23 50 23.00	1.8049	3 37 42.3	13.439	21	1 18 1.61	1.8688	13 45 5.5	11.593
22	23 52 11.29	1.8048	3 51 8.0	13.417	22	1 19 53.82	1.8716	13 56 39.4	11.537
23	23 53 59.58	1.8049	4 4 32.4	13.395	23	1 21 46.20	1.8744	14 8 9.9	11.481
24	23 55 47.88	1.8050	N. 4° 17' 55.4	13.378	24	1 23 38.75	1.8779	N. 14° 19' 37.1	11.424



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 25.					THURSDAY 27.				
0	h m s		N. 14° 19' 37".1	11.494	0	h m s		N. 22° 7' 40".8	7.785
1	1 23 38.75	1.8772	14 31 0.8	11.365	1	2 57 45.76	2.0575	22 15 25.1	7.691
2	1 25 31.46	1.8799	14 42 20.9	11.306	2	3 1 53.19	2.0663	22 23 3.7	7.596
3	1 27 24.34	1.8828	14 53 37.5	11.247	3	3 5 37.30	2.0707	22 30 36.6	7.499
4	1 29 17.40	1.8857	15 4 50.5	11.186	4	3 6 1.68	2.0752	22 38 3.6	7.402
5	1 31 10.63	1.8887	15 15 59.8	11.125	5	3 8 6.33	2.0797	22 45 24.8	7.304
6	1 33 4.05	1.8918	15 27 5.5	11.063	6	3 10 11.24	2.0841	22 52 40.1	7.205
7	1 34 57.65	1.8948	15 38 7.4	11.000	7	3 12 16.42	2.0886	22 59 49.4	7.105
8	1 36 51.43	1.8979	15 49 5.5	10.937	8	3 14 21.87	2.0931	23 6 52.7	7.006
9	1 38 45.40	1.9012	15 59 50.9	10.874	9	3 16 27.59	2.0976	23 13 50.0	6.904
10	1 40 39.57	1.9044	16 10 50.4	10.809	10	3 18 33.58	2.1021	23 20 41.2	6.802
11	1 42 33.93	1.9077	16 21 37.0	10.743	11	3 20 39.84	2.1065	23 27 26.2	6.698
12	1 44 28.49	1.9109	16 32 19.6	10.677	12	3 22 46.36	2.1109	23 34 5.0	6.596
13	1 46 23.24	1.9143	16 42 58.2	10.610	13	3 24 53.15	2.1154	23 40 37.6	6.491
14	1 48 18.20	1.9177	16 53 32.8	10.542	14	3 27 0.21	2.1199	23 47 3.9	6.386
15	1 50 13.36	1.9210	17 4 3.3	10.474	15	3 29 7.54	2.1244	23 53 23.9	6.280
16	1 52 8.72	1.9244	17 14 29.7	10.405	16	3 31 15.14	2.1289	23 59 37.5	6.173
17	1 54 4.29	1.9280	17 24 51.9	10.335	17	3 33 23.01	2.1333	24 5 44.6	6.065
18	1 56 0.08	1.9316	17 35 9.9	10.264	18	3 35 31.14	2.1377	24 11 45.3	5.957
19	1 57 56.08	1.9352	17 45 23.6	10.193	19	3 37 39.54	2.1422	24 17 39.4	5.848
20	1 59 52.30	1.9388	17 55 33.0	10.121	20	3 39 48.20	2.1466	24 23 27.0	5.738
21	2 1 48.74	1.9424	18 5 38.1	10.048	21	3 41 57.13	2.1510	24 29 8.0	5.627
22	2 3 45.39	1.9461	18 15 38.8	9.974	22	3 44 6.32	2.1553	24 34 42.3	5.515
23	2 5 42.27	1.9499	N. 18 25 35.0	9.900	23	3 46 15.77	2.1597	N. 24 40 9.8	5.403
24	2 7 39.38	1.9537							
WEDNESDAY 26.					FRIDAY 28.				
0	2 9 36.71	1.9574	N. 18 35 26.8	9.825	0	3 48 25.49	2.1642	N. 24 45 30.6	5.290
1	2 11 34.27	1.9613	18 45 14.0	9.748	1	3 50 35.47	2.1685	24 50 44.6	5.176
2	2 13 32.07	1.9652	18 54 56.6	9.673	2	3 52 45.71	2.1727	24 55 51.7	5.061
3	2 15 30.10	1.9691	19 4 34.6	9.594	3	3 54 56.20	2.1770	25 0 51.9	4.946
4	2 17 28.36	1.9730	19 14 7.9	9.516	4	3 57 6.95	2.1813	25 5 45.2	4.830
5	2 19 26.86	1.9770	19 23 36.5	9.437	5	3 59 17.96	2.1857	25 10 31.5	4.713
6	2 21 25.60	1.9810	19 33 0.4	9.357	6	4 1 29.23	2.1899	25 15 10.7	4.595
7	2 23 24.58	1.9851	19 42 19.4	9.276	7	4 3 40.75	2.1941	25 19 42.9	4.477
8	2 25 23.81	1.9892	19 51 33.5	9.195	8	4 5 52.52	2.1983	25 24 7.9	4.357
9	2 27 23.28	1.9933	20 0 42.8	9.113	9	4 8 4.53	2.2025	25 28 25.7	4.237
10	2 29 23.00	1.9974	20 9 47.1	9.030	10	4 10 16.79	2.2066	25 32 36.3	4.116
11	2 31 22.97	2.0015	20 18 46.4	8.947	11	4 12 29.30	2.2106	25 36 39.6	3.995
12	2 33 23.18	2.0056	20 27 40.7	8.863	12	4 14 42.06	2.2147	25 40 35.7	3.873
13	2 35 23.64	2.0098	20 36 29.9	8.777	13	4 16 55.06	2.2186	25 44 24.4	3.750
14	2 37 24.36	2.0141	20 45 13.9	8.690	14	4 19 8.29	2.2225	25 48 5.7	3.626
15	2 39 25.34	2.0184	20 53 52.7	8.603	15	4 21 21.76	2.2265	25 51 39.5	3.502
16	2 41 26.57	2.0227	21 2 26.3	8.516	16	4 23 35.47	2.2304	25 55 5.9	3.377
17	2 43 28.06	2.0270	21 10 54.6	8.427	17	4 25 49.41	2.2343	25 58 24.8	3.252
18	2 45 29.81	2.0313	21 19 17.6	8.338	18	4 28 3.58	2.2381	26 1 36.1	3.125
19	2 47 31.82	2.0357	21 27 35.2	8.248	19	4 30 17.98	2.2418	26 4 39.8	2.997
20	2 49 34.09	2.0399	21 35 47.4	8.157	20	4 32 32.60	2.2455	26 7 35.8	2.870
21	2 51 36.61	2.0442	21 43 54.1	8.066	21	4 34 47.44	2.2492	26 10 24.2	2.742
22	2 53 39.39	2.0486	21 51 55.3	7.973	22	4 37 2.50	2.2528	26 13 4.9	2.613
23	2 55 42.44	2.0531	21 59 50.9	7.879	23	4 39 17.77	2.2563	26 15 37.8	2.483
24	2 57 45.76	2.0575	N. 22 7 40.8	7.785	24	4 41 33.26	2.2599	N. 26 18 2.8	2.352

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

PHASES OF THE MOON.

	d	h	m
○ Full Moon, . . . . .	6	13	41.7
☾ Last Quarter, . . . . .	13	6	53.9
● New Moon, . . . . .	20	16	3.1
☾ First Quarter, . . . . .	28	19	53.2

	d	h
☾ Perigee, . . . . .	9	11.1
☾ Apogee, . . . . .	25	11.8

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	SUN W.	112° 9' 6"	3999	113° 33' 27"	3978	114° 58' 4"	3965	116° 22' 56"	3951
	Saturn W.	65 16 49	2987	66 47 18	2973	68 18 4	2961	69 49 6	2947
	α Arietis W.	28 49 40	2978	30 20 20	2961	31 51 22	2943	33 22 46	2927
	Pollux E.	46 49 37	2957	45 18 30	2947	43 47 11	2937	42 15 39	2926
	Regulus E.	83 36 21	2922	82 4 30	2910	80 32 24	2898	79 0 2	2885
2	SUN W.	123 31 33	3176	124 58 11	3160	126 25 8	3144	127 52 24	3129
	Saturn W.	77 28 40	2876	79 1 30	2860	80 34 40	2845	82 8 9	2830
	α Arietis W.	41 5 3	2844	42 38 34	2828	44 12 26	2811	45 46 40	2795
	Pollux E.	34 34 43	2877	33 1 55	2868	31 28 55	2860	29 55 45	2852
	Regulus E.	71 13 59	2816	69 39 52	2802	68 5 27	2787	66 30 42	2772
	Spica E.	125 16 27	2821	123 42 26	2806	122 8 6	2791	120 33 26	2775
3	SUN W.	135 13 45	3043	136 43 4	3026	138 12 44	3009	139 42 45	2993
	Saturn W.	90 0 37	2751	91 36 9	2735	93 12 2	2719	94 48 17	2703
	α Arietis W.	53 43 15	2711	55 19 41	2694	56 56 29	2677	58 33 40	2660
	Aldebaran W.	23 7 13	3118	24 35 3	3051	26 4 13	2993	27 34 34	2942
	Regulus E.	58 31 59	2685	56 55 13	2679	55 18 5	2663	53 40 36	2648
	Spica E.	112 34 58	2686	110 58 13	2680	109 21 6	2664	107 43 38	2648
4	Saturn W.	102 54 51	2624	104 33 14	2607	106 11 59	2592	107 51 5	2577
	α Arietis W.	66 45 13	2577	68 24 40	2561	70 4 29	2545	71 44 40	2528
	Aldebaran W.	35 20 33	2750	36 56 6	2720	38 32 19	2692	40 9 10	2665
	Regulus E.	45 27 51	2569	43 48 14	2553	42 8 15	2538	40 27 55	2522
	Spica E.	99 30 47	2568	97 51 6	2551	96 11 3	2535	94 30 38	2518
5	Saturn W.	116 11 41	2504	117 52 48	2490	119 34 15	2477	121 16 0	2465
	α Arietis W.	80 11 9	2450	81 53 32	2436	83 36 16	2422	85 19 20	2408
	Aldebaran W.	48 21 53	2549	50 1 58	2529	51 42 31	2510	53 23 31	2491
	Regulus E.	32 1 9	2453	30 18 49	2440	28 36 11	2428	26 53 16	2416
	Spica E.	86 3 5	2443	84 20 31	2428	82 37 36	2413	80 54 20	2399
	Antares E.	131 50 58	2436	130 8 14	2421	128 25 9	2407	126 41 44	2393
6	α Arietis W.	93 59 35	2342	95 44 34	2330	97 29 50	2318	99 15 23	2306
	Aldebaran W.	61 54 42	2409	63 38 4	2394	65 21 47	2380	67 5 50	2367
	Pollux W.	19 42 28	2497	21 23 46	2460	23 5 56	2429	24 48 50	2409
	Spica E.	72 13 8	2334	70 27 58	2322	68 42 31	2311	66 56 48	2300
	Antares E.	117 59 45	2327	116 14 25	2315	114 28 48	2304	112 42 54	2292
7	α Arietis W.	108 6 54	2260	109 53 53	2252	111 41 4	2244	113 28 26	2237
	Aldebaran W.	75 50 32	2311	77 36 16	2302	79 22 13	2293	81 8 23	2285
	Pollux W.	33 31 35	2307	35 17 24	2293	37 3 34	2280	38 50 3	2269
	Spica E.	58 4 23	2252	56 17 13	2244	54 29 51	2237	52 42 18	2226
	Antares E.	103 49 28	2243	102 2 5	2235	100 14 29	2227	98 26 41	2219
	Mars E.	127 36 6	2471	125 54 12	2462	124 12 5	2453	122 29 46	2445
8	Aldebaran W.	90 1 53	2253	91 49 1	2249	93 36 15	2246	95 23 34	2243
	Pollux E.	47 46 10	2225	49 34 0	2219	51 21 59	2214	53 10 6	2208
	Spica E.	43 42 13	2204	41 53 51	2200	40 5 24	2197	38 16 52	2195
	Antares E.	89 25 10	2190	87 36 27	2185	85 47 37	2181	83 58 41	2178
	Mars E.	113 55 35	2413	112 12 19	2408	110 28 56	2404	108 45 27	2400
9	Aldebaran W.	104 20 58	2237	106 8 30	2239	107 56 0	2240	109 43 28	2242

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Sun	W. 117° 48' 5"	3237	119° 13' 30"	3222	120° 39' 13"	3207	122° 5' 14"	3192
	Saturn	W. 71 20 25	2933	72 52 2	2919	74 23 57	2905	75 56 9	2891
	α Arietis	W. 34 54 31	2910	36 26 37	2894	37 59 4	2877	39 31 53	2860
	Pollux	E. 40 43 53	2916	39 11 54	2906	37 39 43	2896	36 7 19	2887
	Regulus	E. 77 27 24	2872	75 54 29	2859	74 21 17	2845	72 47 47	2831
2	Sun	W. 129 19 59	3112	130 47 54	3095	132 16 10	3078	133 44 47	3060
	Saturn	W. 83 41 58	2815	85 16 7	2799	86 50 36	2783	88 25 26	2767
	α Arietis	W. 47 21 15	2778	48 56 12	2761	50 31 31	2744	52 7 12	2728
	Pollux	E. 28 22 25	2846	26 48 57	2842	25 15 24	2841	23 41 49	2842
	Regulus	E. 64 55 38	2757	63 20 14	2741	61 44 29	2736	60 8 24	2711
	Spica	E. 118 58 26	2760	117 23 5	2744	115 47 24	2738	114 11 22	2719
3	Sun	W. 141 13 7	2975	142 43 51	2958	144 14 57	2940	145 46 25	2923
	Saturn	W. 96 24 53	2887	98 1 50	2871	99 39 9	2855	101 16 49	2839
	α Arietis	W. 60 11 13	2843	61 49 9	2826	63 27 28	2810	65 6 9	2793
	Aldebaran	W. 29 5 59	2897	30 38 22	2886	32 11 38	2818	33 45 43	2783
	Regulus	E. 52 2 46	2832	50 24 35	2816	48 46 2	2800	47 7 7	2785
	Spica	E. 106 5 48	2832	104 27 36	2815	102 49 2	2799	101 10 6	2782
4	Saturn	W. 109 30 31	2562	111 10 18	2547	112 50 26	2533	114 30 54	2519
	α Arietis	W. 73 25 14	2512	75 6 10	2497	76 47 28	2481	78 29 8	2466
	Aldebaran	W. 41 46 37	2640	43 24 38	2615	45 3 12	2593	46 42 17	2570
	Regulus	E. 38 47 14	2509	37 6 13	2494	35 24 51	2480	33 45 10	2466
	Spica	E. 92 49 50	2563	91 8 41	2487	89 27 10	2472	87 43 18	2458
5	Saturn	W. 122 58 2	2453	124 40 22	2441	126 22 58	2430	128 5 50	2419
	α Arietis	W. 87 2 44	2394	88 46 28	2380	90 30 32	2367	92 14 54	2354
	Aldebaran	W. 55 4 57	2473	56 46 48	2456	58 29 3	2440	60 11 41	2424
	Regulus	E. 25 10 4	2405	23 26 37	2396	21 42 57	2388	19 59 5	2382
	Spica	E. 79 10 44	2386	77 26 49	2372	75 42 34	2359	73 58 0	2346
	Antares	E. 124 57 59	2379	123 13 54	2366	121 29 30	2353	119 44 47	2340
6	α Arietis	W. 101 1 11	2297	102 47 15	2287	104 33 34	2277	106 20 7	2268
	Aldebaran	W. 68 50 12	2355	70 34 52	2343	72 19 49	2331	74 5 3	2321
	Pollux	W. 26 32 22	2378	28 16 29	2357	30 1 5	2339	31 46 8	2322
	Spica	E. 65 10 49	2289	63 24 34	2279	61 38 4	2270	59 51 20	2261
	Antares	E. 110 56 43	2261	109 10 16	2271	107 23 34	2263	105 36 38	2252
7	α Arietis	W. 115 15 59	2231	117 3 41	2225	118 51 32	2219	120 39 31	2215
	Aldebaran	W. 82 54 45	2277	84 41 18	2270	86 28 1	2264	88 14 53	2259
	Pollux	W. 40 36 48	2250	42 23 48	2240	44 11 3	2240	45 58 31	2233
	Spica	E. 50 54 34	2223	49 6 41	2217	47 18 39	2212	45 30 29	2206
	Antares	E. 96 38 42	2212	94 50 33	2206	93 2 14	2200	91 13 46	2194
	Mars	E. 120 47 16	2438	119 4 35	2431	117 21 44	2424	115 38 44	2418
8	Aldebaran	W. 97 10 58	2241	98 58 25	2239	100 45 55	2238	102 33 26	2237
	Pollux	W. 54 5 21	2204	56 46 42	2201	58 35 8	2196	60 23 38	2196
	Spica	E. 36 28 17	2194	34 39 40	2194	32 51 3	2194	31 2 26	2195
	Antares	E. 82 9 41	2176	80 20 37	2173	78 31 29	2171	76 42 17	2160
	Mars	E. 107 1 53	2307	105 18 14	2305	103 34 32	2293	101 50 47	2291
9	Aldebaran	W. 111 30 53	2245	113 18 14	2246	115 5 30	2253	116 52 30	2256

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dif.	IIIh.	P. L. of Dif.	VIh.	P. L. of Dif.	IXh.	P. L. of Dif.
9	Pollux W.	62° 12' 12"	9194	64° 0' 49"	9193	65° 49' 27"	9199	67° 38' 6"	9199
	Regulus W.	25 10 4	9199	26 58 43	9189	28 47 27	9188	30 36 15	9185
	Spica E.	29 13 51	9197	27 25 19	9200	25 36 52	9205	23 48 32	9210
	Antares E.	74 53 3	9169	73 3 48	9169	71 14 33	9169	69 25 18	9169
	Mars E.	100 7 0	9290	98 23 11	9290	96 39 22	9289	94 55 32	9290
	α Aquilæ E.	123 58 27	9095	122 30 11	9058	121 1 10	9025	119 31 28	9094
	SUN E.	147 14 48	9483	145 33 11	9483	143 51 34	9483	142 9 57	9484
10	Aldebaran W.	118 39 41	9263	120 26 35	9270	122 13 19	9277	123 59 53	9284
	Pollux W.	76 41 9	9199	78 29 38	9202	80 18 3	9205	82 6 23	9209
	Regulus W.	39 40 23	9189	41 29 7	9191	43 17 48	9194	45 6 25	9197
	Antares E.	60 19 27	9178	58 30 27	9181	56 41 31	9184	54 52 40	9188
	Mars E.	86 16 48	9400	84 33 13	9403	82 49 42	9407	81 6 17	9410
	α Aquilæ E.	111 54 50	9289	110 22 17	9278	108 49 27	9264	107 16 22	9255
	SUN E.	133 42 13	9499	132 0 48	9496	130 19 29	9499	128 38 15	9503
11	Pollux W.	91 6 29	9233	92 54 8	9238	94 41 39	9244	96 29 1	9251
	Regulus W.	54 8 5	9219	55 56 5	9225	57 43 56	9230	59 31 39	9236
	Antares E.	45 50 1	9212	44 1 51	9218	42 13 50	9225	40 25 59	9231
	Mars E.	72 30 44	9436	70 48 0	9442	69 5 25	9448	67 22 58	9455
	α Aquilæ E.	99 28 39	9232	97 54 53	9233	96 21 8	9235	94 47 25	9238
	SUN E.	120 13 37	9529	118 33 4	9535	116 52 39	9541	115 12 23	9548
12	Pollux W.	105 23 21	9286	107 9 41	9294	108 55 50	9299	110 41 47	9310
	Regulus W.	68 27 53	9269	70 14 38	9277	72 1 12	9284	73 47 35	9291
	Spica W.	14 38 37	9255	16 23 17	9245	18 8 11	9240	19 53 13	9238
	Antares E.	31 29 4	9264	29 42 12	9272	27 55 31	9279	26 9 1	9287
	Mars E.	58 53 11	9490	57 11 44	9499	55 30 29	9507	53 49 25	9515
	α Aquilæ E.	87 0 21	9271	85 27 25	9282	83 54 43	9283	82 22 15	9295
	SUN E.	106 53 27	9585	105 14 11	9592	103 35 5	9600	101 56 10	9609
13	Pollux W.	119 28 27	9254	121 13 8	9263	122 57 36	9273	124 41 50	9282
	Regulus W.	82 36 41	9231	84 21 55	9239	86 6 57	9248	87 51 47	9255
	Spica W.	28 38 7	9253	30 22 49	9258	32 7 24	9264	33 51 50	9271
	Mars E.	45 26 58	9558	43 47 5	9566	42 7 24	9575	40 27 55	9585
	α Aquilæ E.	74 44 30	9289	73 14 3	9299	71 44 1	9301	70 14 27	9305
	SUN E.	93 44 29	9652	92 6 44	9660	90 29 11	9669	88 51 50	9679
14	Regulus W.	96 32 58	9296	98 16 35	9407	100 0 0	9415	101 43 13	9424
	Spica W.	42 31 32	9407	44 14 57	9415	45 58 11	9423	47 41 13	9431
	Mars E.	32 13 42	9632	30 35 30	9641	28 57 31	9652	27 19 46	9661
	α Aquilæ E.	62 54 34	9300	61 28 25	9326	60 2 58	9374	58 38 16	9315
	SUN E.	80 48 10	9725	79 12 3	9734	77 36 8	9743	76 0 25	9752
15	Regulus W.	110 16 16	9467	111 58 16	9475	113 40 4	9484	115 21 40	9492
	Spica W.	56 13 37	9470	57 55 32	9479	59 37 15	9487	61 18 47	9495
	Antares W.	10 22 12	9462	12 4 18	9470	13 46 13	9479	15 27 56	9487
	α Aquilæ E.	51 47 48	9573	50 28 44	9637	49 10 50	9708	47 54 12	9765
	SUN E.	68 4 53	9798	66 30 23	9808	64 56 5	9818	63 22 0	9827
16	Spica W.	69 43 33	9536	71 23 56	9544	73 4 8	9552	74 44 9	9561
	Antares W.	23 53 34	9529	25 34 7	9538	27 14 28	9546	28 54 38	9554

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
9	Pollux W.	69 26 45	2192	71 15 24	2194	73 4 1	2195	74 52 36	2196
	Regulus W.	32 25 5	2184	34 13 56	2184	36 2 47	2186	37 51 36	2187
	Spica E.	22 0 20	2218	20 12 20	2220	18 24 36	2244	16 37 14	2264
	Antares E.	67 36 3	2170	65 46 50	2171	63 57 39	2173	62 8 31	2176
	Mars E.	93 11 43	2291	91 27 55	2293	89 44 10	2294	88 0 27	2297
	$\alpha$ Aquilæ E.	118 1 8	2268	116 30 15	2244	114 58 52	2294	113 27 3	2295
10	Sun E.	140 28 21	2484	138 46 46	2485	137 5 12	2487	135 23 41	2489
	Aldebaran W.	125 46 16	2223	127 32 26	2202	129 18 22	2213	131 4 3	2234
	Pollux W.	83 54 37	2213	85 42 45	2217	87 30 47	2222	89 18 42	2227
	Regulus W.	46 54 57	2201	48 43 23	2205	50 31 43	2209	52 19 57	2213
	Antares E.	53 3 55	2192	51 15 16	2197	49 26 44	2199	47 38 19	2206
	Mars E.	79 22 57	2414	77 39 43	2419	75 56 36	2424	74 13 36	2430
11	$\alpha$ Aquilæ E.	105 43 5	2247	104 9 38	2241	102 36 3	2237	101 2 23	2234
	Sun E.	126 57 6	2507	125 16 3	2519	123 35 7	2517	121 54 18	2523
	Pollux W.	98 16 13	2257	100 3 16	2264	101 50 8	2271	103 36 50	2279
	Regulus W.	61 19 13	2242	63 6 38	2249	64 53 53	2256	66 40 58	2262
	Antares E.	38 38 17	2237	36 50 44	2243	35 3 20	2250	33 16 7	2257
	Mars E.	65 40 41	2462	63 58 34	2468	62 16 36	2475	60 34 48	2483
12	$\alpha$ Aquilæ E.	93 13 46	2242	91 40 13	2248	90 6 47	2254	88 33 29	2260
	Sun E.	113 32 16	2554	111 52 18	2561	110 12 30	2569	108 32 53	2577
	Pollux W.	112 27 32	2318	114 13 5	2327	115 58 26	2336	117 43 33	2345
	Regulus W.	75 33 47	2299	77 19 48	2307	79 5 37	2315	80 51 15	2323
	Spica W.	21 38 17	2338	23 23 21	2340	25 8 22	2344	26 53 18	2346
	Antares E.	24 22 42	2294	22 36 34	2309	20 50 38	2311	19 4 54	2318
13	Mars E.	52 8 32	2523	50 27 51	2531	48 47 21	2540	47 7 3	2549
	$\alpha$ Aquilæ E.	80 50 3	2290	79 18 9	2295	77 46 35	2291	76 15 21	2289
	Sun E.	100 17 27	2517	98 38 55	2526	97 0 35	2534	95 22 26	2543
	Pollux W.	126 25 51	2321	128 9 38	2402	129 53 10	2412	131 36 28	2423
	Regulus W.	89 36 26	2324	91 20 53	2373	93 5 7	2381	94 49 9	2390
	Spica W.	35 36 7	2378	37 20 14	2385	39 4 10	2392	40 47 56	2399
14	Antares E.	38 48 39	2594	37 9 36	2603	35 30 45	2612	33 52 7	2622
	$\alpha$ Aquilæ E.	68 45 22	3061	67 16 49	3108	65 48 49	3136	64 21 23	3167
	Sun E.	87 14 42	2688	85 37 46	2697	84 1 2	2706	82 24 30	2715
	Regulus W.	103 26 14	2432	105 9 3	2441	106 51 40	2450	108 34 4	2458
	Spica W.	49 24 4	2438	51 6 44	2446	52 49 13	2454	54 31 31	2462
	Mars E.	25 42 14	2672	24 4 56	2682	22 27 52	2693	20 51 3	2705
15	$\alpha$ Aquilæ E.	57 14 22	3359	55 51 18	3407	54 29 9	3458	53 7 58	3513
	Sun E.	74 24 54	2761	72 49 35	2771	71 14 29	2780	69 39 35	2789
	Regulus W.	117 3 4	2501	118 44 16	2510	120 25 16	2518	122 6 4	2527
	Spica W.	63 0 7	2523	64 41 16	2512	66 22 13	2520	68 2 59	2528
	Antares W.	17 9 27	2486	18 50 46	2504	20 31 54	2512	22 12 50	2521
	$\alpha$ Aquilæ E.	46 38 54	3260	45 25 3	3261	44 12 45	3263	43 2 7	3264
16	Sun E.	61 48 7	2636	60 14 26	2645	58 40 57	2654	57 7 39	2663
	Spica W.	76 23 58	2569	78 3 36	2577	79 43 2	2585	81 22 17	2594
	Antares W.	30 34 36	2562	32 14 23	2571	33 53 58	2579	35 33 22	2588

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
16	SUN	E.	55° 34' 33"	9873	54° 1' 30"	9898	52° 28' 57"	9891	50° 56' 27"	9901
17	Spica	W.	83 1 20	9809	84 40 12	9810	86 18 53	9818	87 57 23	9826
	Antares	W.	37 12 34	9806	38 51 35	9804	40 30 25	9812	42 9 3	9821
	SUN	E.	43 16 57	9848	41 45 39	9858	40 14 33	9867	38 43 39	9877
18	Spica	W.	96 7 3	9869	97 44 25	9878	99 21 35	9886	100 58 34	9894
	Antares	W.	50 19 24	9863	51 56 54	9871	53 34 13	9879	55 11 21	9887
	SUN	E.	31 12 13	9897	29 42 34	9838	28 13 8	9849	26 43 56	9860
22	SUN	W.	15 30 15	3360	16 53 17	3369	18 16 17	3365	19 39 14	3368
	α Arietis	E.	47 24 24	3064	45 53 26	2973	44 22 40	2983	42 52 6	2993
	Aldebaran	E.	79 55 24	3001	78 25 13	3009	76 55 12	3018	75 25 22	3027
	Pollux	E.	122 7 4	2964	120 36 6	2970	119 5 16	2977	117 34 35	2985
23	SUN	W.	26 32 47	3393	27 55 11	3399	29 17 29	3404	30 39 41	3410
	α Arietis	E.	35 22 17	3042	33 52 56	3053	32 23 49	3064	30 54 55	3075
	Aldebaran	E.	67 58 52	3069	66 30 5	3078	65 1 29	3087	63 33 3	3096
	Pollux	E.	110 3 19	3018	108 33 29	3025	107 3 47	3031	105 34 12	3037
24	SUN	W.	37 29 4	3437	38 50 39	3441	40 12 9	3446	41 33 34	3450
	Venus	W.	18 58 54	3691	20 15 51	3675	21 33 5	3683	22 50 31	3655
	Aldebaran	E.	56 13 26	3137	54 46 1	3145	53 18 46	3153	51 51 41	3169
	Pollux	E.	98 8 6	3064	96 39 12	3069	95 10 24	3073	93 41 41	3078
	Regulus	E.	135 8 2	3052	133 38 54	3056	132 9 51	3061	130 40 53	3065
25	SUN	W.	48 19 34	3466	49 40 36	3469	51 1 35	3471	52 22 32	3479
	Venus	W.	29 19 27	3631	30 37 28	3626	31 55 32	3625	33 13 39	3623
	Saturn	W.	23 38 59	3392	25 3 20	3378	26 28 0	3363	27 52 55	3351
	Aldebaran	E.	44 38 51	3207	43 12 50	3216	41 47 0	3226	40 21 22	3237
	Pollux	E.	86 19 20	3094	84 51 3	3096	83 22 49	3098	81 54 37	3100
	Regulus	E.	123 17 8	3079	121 48 33	3082	120 20 1	3084	118 51 32	3086
26	SUN	W.	59 7 1	3473	60 27 55	3479	61 48 50	3471	63 9 47	3469
	Venus	W.	39 44 52	3610	41 3 15	3607	42 21 42	3603	43 40 13	3599
	Saturn	W.	35 0 25	3210	36 26 22	3204	37 52 26	3198	39 18 38	3191
	Aldebaran	E.	33 16 45	3307	31 52 41	3325	30 28 59	3346	29 5 41	3371
	Pollux	E.	74 34 3	3103	73 5 57	3103	71 37 51	3109	70 9 44	3101
	Regulus	E.	111 29 21	3086	110 0 54	3095	108 32 27	3094	107 3 58	3092
27	SUN	W.	69 55 14	3459	71 16 32	3447	72 37 55	3441	73 59 25	3436
	Venus	W.	50 13 55	3578	51 32 56	3570	52 52 3	3564	54 11 17	3556
	Saturn	W.	46 31 31	3159	47 58 29	3153	49 25 35	3146	50 52 49	3138
	Pollux	E.	62 48 37	3088	61 20 13	3085	59 51 45	3081	58 23 12	3077
	Regulus	E.	99 40 50	3067	98 12 0	3063	96 43 4	3057	95 14 2	3053
28	SUN	W.	80 48 43	3399	82 11 1	3390	83 33 29	3381	84 56 7	3371
	Venus	W.	60 49 32	3515	62 9 39	3506	63 29 57	3495	64 50 27	3485
	Saturn	W.	58 11 21	3098	59 39 35	3087	61 8 0	3078	62 36 37	3067
	α Arietis	W.	24 44 37	3097	26 12 50	3089	27 41 24	3084	29 10 17	3049
	Pollux	E.	50 58 58	3049	49 29 46	3043	48 0 26	3035	46 30 57	3028
	Regulus	E.	87 47 3	3018	86 17 13	3010	84 47 13	3008	83 17 2	2993

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
16	SUN	E.	49° 24' 9"	2910	47° 52' 3"	2920	46° 20' 9"	2929	44° 48' 27"	2939
17	Spica	W.	89 35 42	2935	91 13 49	2943	92 51 45	2952	94 29 30	2960
	Antares	W.	43 47 30	2939	45 25 46	2938	47 3 50	2946	48 41 43	2955
	SUN	E.	37 12 57	2966	35 42 27	2997	34 12 10	3006	32 42 5	3017
18	Spica	W.	102 35 22	2703	104 11 58	2711	105 48 23	2720	107 24 37	2729
	Antares	W.	56 48 18	2986	58 25 3	2704	60 1 37	2713	61 37 59	2722
	SUN	E.	25 14 57	3079	23 46 13	3084	22 17 44	3096	20 49 30	3110
22	SUN	W.	21 2 7	3372	22 24 56	3377	23 47 39	3382	25 10 16	3387
	α Arietis	E.	41 21 44	3002	39 51 34	3019	38 21 36	3022	36 51 50	3032
	Aldebaran	E.	73 55 43	3035	72 26 14	3044	70 56 56	3053	69 27 49	3061
	Pollux	E.	116 4 3	2991	114 33 39	2998	113 3 24	3005	111 33 17	3012
23	SUN	W.	32 1 46	3415	33 23 45	3422	34 45 37	3427	36 7 23	3431
	α Arietis	E.	29 26 15	3087	27 57 50	3100	26 29 40	3114	25 1 47	3129
	Aldebaran	E.	62 4 48	3104	60 36 43	3111	59 8 47	3119	57 41 1	3128
	Pollux	E.	104 4 45	3043	102 35 25	3048	101 6 12	3054	99 37 6	3059
24	SUN	W.	42 54 54	3454	44 16 10	3458	45 37 21	3461	46 58 29	3463
	Venus	W.	24 8 6	3649	25 25 48	3643	26 43 36	3638	28 1 29	3634
	Aldebaran	E.	50 24 46	3170	48 58 1	3179	47 31 27	3188	46 5 4	3197
	Pollux	E.	92 13 4	3082	90 44 32	3085	89 16 4	3088	87 47 40	3091
	Regulus	E.	129 12 0	3069	127 43 12	3071	126 14 27	3074	124 45 46	3077
25	SUN	W.	53 43 27	3473	55 4 21	3473	56 25 15	3474	57 46 8	3474
	Venus	W.	34 31 48	3621	35 50 0	3618	37 8 15	3616	38 26 32	3613
	Saturn	W.	29 18 4	3941	30 43 25	3932	32 8 56	3925	33 34 36	3917
	Aldebaran	E.	38 55 57	3049	37 30 46	3061	36 5 49	3075	34 41 8	3090
	Pollux	E.	80 26 28	3102	78 58 21	3103	77 30 15	3103	76 2 9	3103
	Regulus	E.	117 23 5	3067	115 54 39	3067	114 26 13	3067	112 57 47	3067
26	SUN	W.	64 30 46	3467	65 51 47	3463	67 12 52	3460	68 34 1	3456
	Venus	W.	44 58 48	3596	46 17 27	3591	47 36 11	3586	48 55 0	3581
	Saturn	W.	40 44 58	3185	42 11 25	3179	43 37 59	3173	45 4 41	3166
	Aldebaran	E.	27 42 51	3399	26 20 33	3432	24 58 53	3471	23 37 57	3517
	Pollux	E.	68 41 36	3100	67 13 26	3097	65 45 13	3095	64 16 57	3092
	Regulus	E.	105 35 27	3080	104 6 53	3078	102 38 16	3074	101 9 35	3071
27	SUN	W.	75 21 1	3430	76 42 44	3423	78 4 35	3415	79 26 34	3407
	Venus	W.	55 30 39	3549	56 50 9	3542	58 9 47	3533	59 29 35	3524
	Saturn	W.	52 20 12	3131	53 47 44	3123	55 15 26	3114	56 43 18	3105
	Pollux	E.	56 54 34	3072	55 25 50	3067	53 57 0	3061	52 28 3	3055
	Regulus	E.	93 44 54	3047	92 15 39	3040	90 46 16	3033	89 16 44	3028
28	SUN	W.	86 18 57	3360	87 41 59	3350	89 5 13	3338	90 28 40	3326
	Venus	W.	66 11 8	3474	67 32 1	3463	68 53 7	3450	70 14 27	3437
	Saturn	W.	64 5 27	3056	65 34 30	3046	67 3 46	3035	68 33 16	3023
	α Arietis	W.	30 39 29	3034	32 8 59	3020	33 38 47	3005	35 8 53	2991
	Pollux	E.	45 1 19	3021	43 31 32	3013	42 1 36	3006	40 31 30	2998
	Regulus	E.	81 46 40	2984	80 16 7	2973	78 45 21	2962	77 14 21	2951



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
Sat.	1	<sup>h</sup> 22 <sup>m</sup> 48 <sup>s</sup> 17.66	9.363	S. 7° 36' 25.4"	+56.95	16 10.44	65.44	<sup>m</sup> 12 <sup>s</sup> 35.15	0.492
Sun.	2	22 52 2.10	9.342	7 13 35.3	57.21	16 10.20	65.37	12 23.06	0.514
Mon.	3	22 55 46.03	9.321	6 50 39.3	57.45	16 9.96	65.30	12 10.46	0.535
Tues.	4	22 59 29.46	9.301	6 27 37.5	57.68	16 9.72	65.23	11 57.38	0.554
Wed.	5	23 3 12.42	9.282	6 4 30.5	57.89	16 9.47	65.17	11 43.83	0.573
Thur.	6	23 6 54.94	9.263	5 41 18.6	58.09	16 9.22	65.11	11 29.83	0.591
Frid.	7	23 10 37.04	9.245	5 18 2.1	58.27	16 8.96	65.05	11 15.42	0.609
Sat.	8	23 14 18.74	9.229	4 54 41.5	58.44	16 8.71	64.99	11 0.61	0.625
Sun.	9	23 18 0.05	9.214	4 31 17.0	58.59	16 8.45	64.93	10 45.42	0.640
Mon.	10	23 21 41.01	9.200	4 7 48.9	58.73	16 8.19	64.88	10 29.87	0.654
Tues.	11	23 25 21.65	9.186	3 44 17.6	58.86	16 7.92	64.83	10 13.99	0.668
Wed.	12	23 29 1.98	9.174	3 20 43.6	58.98	16 7.65	64.78	9 57.80	0.680
Thur.	13	23 32 42.03	9.162	2 57 7.3	59.06	16 7.38	64.74	9 41.34	0.691
Frid.	14	23 36 21.80	9.152	2 33 28.9	59.14	16 7.11	64.70	9 24.60	0.702
Sat.	15	23 40 1.33	9.143	2 9 48.9	59.20	16 6.83	64.66	9 7.62	0.712
Sun.	16	23 43 40.65	9.134	1 46 7.5	59.25	16 6.56	64.63	8 50.43	0.720
Mon.	17	23 47 19.77	9.126	1 22 25.2	59.28	16 6.28	64.60	8 33.05	0.728
Tues.	18	23 50 58.70	9.119	0 58 42.1	59.29	16 6.01	64.57	8 15.49	0.735
Wed.	19	23 54 37.47	9.113	0 34 59.0	59.29	16 5.73	64.55	7 57.76	0.742
Thur.	20	23 58 16.32	9.107	S. 0 11 16.1	59.27	16 5.45	64.53	7 39.89	0.747
Frid.	21	0 1 54.65	9.102	N. 0 12 26.2	59.24	16 5.17	64.51	7 21.91	0.752
Sat.	22	0 5 33.05	9.098	0 36 7.6	59.19	16 4.90	64.49	7 3.82	0.756
Sun.	23	0 9 11.37	9.094	0 59 47.6	59.13	16 4.62	64.48	6 45.63	0.759
Mon.	24	0 12 49.60	9.091	1 23 25.8	59.05	16 4.35	64.48	6 27.36	0.762
Tues.	25	0 16 27.77	9.089	1 47 1.8	58.95	16 4.07	64.47	6 9.03	0.765
Wed.	26	0 20 5.90	9.088	2 10 35.3	58.84	16 3.80	64.47	5 50.66	0.766
Thur.	27	0 23 44.01	9.087	2 34 5.9	58.71	16 3.53	64.47	5 32.28	0.766
Frid.	28	0 27 22.13	9.087	2 57 33.3	58.57	16 3.26	64.47	5 13.88	0.766
Sat.	29	0 31 0.26	9.088	3 20 57.1	58.41	16 2.98	64.47	4 55.48	0.766
Sun.	30	0 34 38.39	9.090	3 44 16.8	58.24	16 2.71	64.47	4 37.13	0.764
Mon.	31	0 38 16.59	9.093	4 7 32.3	58.05	16 2.44	64.49	4 18.83	0.761
Tues.	32	0 41 54.87	9.096	N. 4 30 43.2	+57.85	16 2.16	64.51	4 0.60	0.758

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0<sup>m</sup>.18 from the Sideral Time.

+ prefixed to the hourly change of declination indicates that south declinations are decreasing and north declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Sat.	1	<sup>h</sup> 22 <sup>m</sup> 48 <sup>s</sup> 15.71	9.364	S. <sup>°</sup> 7 <sup>'</sup> 36 <sup>"</sup> 37.3	+56.96	<sup>m</sup> 12 <sup>s</sup> 35.25	0.492	<sup>h</sup> 22 <sup>m</sup> 35 <sup>s</sup> 40.46
Sun.	2	22 52 0.18	9.343	7 13 47.1	57.22	12 23.16	0.514	22 39 37.02
Mon.	3	22 55 44.14	9.322	6 50 50.9	57.46	12 10.57	0.535	22 43 33.57
Tues.	4	22 59 27.61	9.302	6 27 49.0	57.69	11 57.49	0.554	22 47 30.13
Wed.	5	23 3 10.61	9.283	6 4 41.8	57.90	11 43.94	0.573	22 51 26.67
Thur.	6	23 6 53.17	9.265	5 41 29.7	58.10	11 29.94	0.591	22 55 23.23
Frid.	7	23 10 35.31	9.247	5 18 13.0	58.28	11 15.53	0.609	22 59 19.78
Sat.	8	23 14 17.05	9.231	4 54 52.2	58.45	11 0.72	0.625	23 3 16.33
Sun.	9	23 17 58.41	9.216	4 31 27.4	58.60	10 45.53	0.640	23 7 12.88
Mon.	10	23 21 39.41	9.202	4 7 59.1	58.74	10 29.98	0.654	23 11 9.44
Tues.	11	23 25 20.09	9.188	3 44 27.6	58.87	10 14.10	0.668	23 15 5.99
Wed.	12	23 29 0.46	9.176	3 20 53.4	58.99	9 57.91	0.680	23 19 2.55
Thur.	13	23 32 40.55	9.164	2 57 16.8	59.07	9 41.45	0.691	23 22 59.10
Frid.	14	23 36 20.37	9.154	2 33 38.1	59.15	9 24.71	0.702	23 26 55.66
Sat.	15	23 39 59.94	9.145	2 9 57.8	59.21	9 7.73	0.712	23 30 52.21
Sun.	16	23 43 39.31	9.136	1 46 16.1	59.26	8 50.54	0.720	23 34 48.77
Mon.	17	23 47 18.48	9.128	1 22 33.5	59.29	8 33.16	0.728	23 38 45.31
Tues.	18	23 50 57.46	9.121	0 58 50.2	59.30	8 15.59	0.735	23 42 41.87
Wed.	19	23 54 36.28	9.115	0 35 6.8	59.30	7 57.86	0.742	23 46 38.42
Thur.	20	23 58 14.97	9.109	S. 0 11 23.6	59.28	7 39.99	0.747	23 50 34.98
Frid.	21	0 1 53.54	9.104	N. 0 12 19.0	59.25	7 22.01	0.752	23 54 31.52
Sat.	22	0 5 31.99	9.100	0 36 0.7	59.20	7 3.91	0.756	23 58 28.08
Sun.	23	0 9 10.35	9.096	0 59 41.0	59.14	6 45.72	0.759	0 2 24.63
Mon.	24	0 12 48.63	9.093	1 23 19.5	59.06	6 27.44	0.762	0 6 21.19
Tues.	25	0 16 26.85	9.091	1 46 55.8	58.96	6 9.11	0.765	0 10 17.74
Wed.	26	0 20 5.03	9.090	2 10 29.7	58.85	5 50.73	0.766	0 14 14.30
Thur.	27	0 23 43.19	9.089	2 34 0.6	58.72	5 32.35	0.766	0 18 10.84
Frid.	28	0 27 21.35	9.089	2 57 28.3	58.58	5 13.95	0.766	0 22 7.40
Sat.	29	0 30 59.52	9.090	3 20 52.4	58.42	4 55.55	0.766	0 26 3.95
Sun.	30	0 34 37.70	9.092	3 44 12.4	58.25	4 37.19	0.764	0 30 0.51
Mon.	31	0 38 15.95	9.095	4 7 28.2	58.06	4 18.89	0.761	0 33 57.06
Tues.	32	0 41 54.27	9.098	N. 4 30 39.4	+57.86	4 0.65	0.758	0 37 53.62

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

+ prefixed to the hourly change of declination indicates that south declinations are decreasing and north declinations are increasing.

Diff. for 1 hour.

+ 9°.8565

(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal 0 <sup>s</sup> .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	60	340° 34' 20.1	33' 56.6	150.42	+0.16	9.9962057	+44.2	<sup>h</sup> 1 <sup>m</sup> 24 <sup>s</sup> 5.73
2	61	341 34 29.3	34 5.6	150.33	+0.05	.9963125	44.7	1 20 9.82
3	62	342 34 36.3	34 12.5	150.24	-0.07	.9964206	45.2	1 16 13.91
4	63	343 34 41.1	34 17.2	150.15	0.20	.9965299	45.8	1 12 18.00
5	64	344 34 43.8	34 19.8	150.07	0.33	.9966406	46.4	1 8 22.10
6	65	345 34 44.5	34 20.4	149.99	0.47	.9967528	47.0	1 4 26.19
7	66	346 34 43.3	34 19.1	149.91	0.58	.9968665	47.7	1 0 30.28
8	67	347 34 40.2	34 15.9	149.83	0.68	.9969817	48.3	0 56 34.37
9	68	348 34 35.1	34 10.7	149.75	0.75	.9970983	48.9	0 52 38.47
10	69	349 34 28.2	34 3.7	149.67	0.80	.9972164	49.5	0 48 42.56
11	70	350 34 19.5	33 55.0	149.60	0.81	.9973359	50.0	0 44 46.65
12	71	351 34 9.2	33 44.5	149.52	0.80	.9974565	50.5	0 40 50.74
13	72	352 33 57.0	33 32.2	149.45	0.76	.9975782	50.9	0 36 54.84
14	73	353 33 42.9	33 18.0	149.38	0.68	.9977008	51.2	0 32 58.93
15	74	354 33 27.2	33 2.2	149.31	0.59	.9978241	51.5	0 29 3.02
16	75	355 33 9.9	32 44.8	149.24	0.47	.9979479	51.7	0 25 7.11
17	76	356 32 50.9	32 25.7	149.17	0.34	.9980722	51.9	0 21 11.21
18	77	357 32 30.1	32 4.8	149.10	0.21	.9981968	52.0	0 17 15.30
19	78	358 32 7.5	31 42.1	149.02	-0.07	.9983216	52.0	0 13 19.39
20	79	359 31 43.1	31 17.6	148.95	+0.07	.9984464	52.0	0 9 23.48
21	80	0 31 16.9	30 51.3	148.87	0.18	.9985710	51.9	0 5 27.58
22	81	1 30 48.7	30 23.0	148.79	0.28	.9986954	51.8	0 1 31.67
23	82	2 30 18.4	29 52.6	148.70	0.34	.9988196	51.7	23 57 35.76
24	83	3 29 46.0	29 20.1	148.61	0.39	.9989432	51.6	23 53 39.85
25	84	4 29 11.6	28 45.6	148.52	0.41	.9990670	51.4	23 49 43.95
26	85	5 28 35.0	28 8.9	148.43	0.37	.9991902	51.2	23 45 48.04
27	86	6 27 56.0	27 29.8	148.33	0.33	.9993130	51.1	23 41 52.13
28	87	7 27 14.7	26 48.4	148.24	0.25	.9994356	51.1	23 37 56.22
29	88	8 26 31.2	26 4.7	148.14	0.16	.9995581	51.0	23 34 0.32
30	89	9 25 45.3	25 18.7	148.04	+0.03	.9996806	51.0	23 30 4.41
31	90	10 24 57.0	24 30.3	147.94	-0.10	.9998031	51.1	23 26 8.50
32	91	11 24 6.4	23 39.6	147.84	-0.22	9.9999258	+51.1	23 22 12.59
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 hour. —9 <sup>s</sup> .8296 (Table II.)

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
1	15 2.1	15 7.1	55 3.9	+1.42	55 22.2	+1.62	<sup>h</sup> <sup>m</sup> 6 19.2	<sup>m</sup> 2.20	<sup>d</sup> 8.3
2	15 12.7	15 18.9	55 42.8	1.80	56 5.5	1.97	7 12.7	2.26	9.3
3	15 25.6	15 32.7	56 30.1	2.11	56 56.2	2.22	8 7.1	2.27	10.3
4	15 40.1	15 47.7	57 23.4	2.20	57 51.1	2.32	9 1.3	2.24	11.3
5	15 55.2	16 2.6	58 18.9	2.30	58 46.1	2.22	9 54.5	2.19	12.3
6	16 9.7	16 16.3	59 12.2	2.09	59 36.3	1.90	10 46.5	2.14	13.3
7	16 22.2	16 27.2	59 58.0	1.67	60 16.5	1.40	11 37.7	2.12	14.3
8	16 31.3	16 34.3	60 31.5	1.09	60 42.5	0.74	12 28.7	2.14	15.3
9	16 36.1	16 36.8	60 49.2	+0.33	60 51.6	+0.02	13 20.7	2.20	16.3
10	16 36.3	16 34.7	60 49.8	-0.32	60 43.9	-0.65	14 14.6	2.30	17.3
11	16 32.0	16 28.5	60 34.2	0.95	60 21.2	1.20	15 11.0	2.41	18.3
12	16 24.2	16 19.2	60 5.4	1.42	59 47.3	1.59	16 10.0	2.50	19.3
13	16 13.9	16 8.1	59 27.4	1.71	59 6.3	1.79	17 10.5	2.53	20.3
14	16 2.2	15 56.2	58 44.5	1.83	58 22.5	1.83	18 10.6	2.47	21.3
15	15 50.2	15 44.3	58 0.4	1.82	57 38.8	1.77	19 8.4	2.34	22.3
16	15 38.6	15 33.1	57 17.9	1.71	56 57.8	1.64	20 2.6	2.17	23.3
17	15 27.9	15 23.0	56 38.6	1.56	56 20.4	1.47	20 52.7	2.00	24.3
18	15 18.3	15 13.9	56 3.3	1.38	55 47.3	1.29	21 39.2	1.87	25.3
19	15 9.8	15 6.1	55 32.3	1.21	55 18.4	1.12	22 22.7	1.76	26.3
20	15 2.6	14 59.3	55 5.6	1.03	54 53.8	0.94	23 4.2	1.70	27.3
21	14 56.5	14 53.8	54 43.1	0.85	54 33.4	0.77	23 44.7	1.68	28.3
22	14 51.5	14 49.4	54 24.7	0.67	54 17.2	0.58	<sup>d</sup> 0 25.2		29.3
23	14 47.7	14 46.2	54 10.8	0.48	54 5.6	0.38	0 25.2	1.70	0.6
24	14 45.2	14 44.5	54 1.7	0.27	53 59.2	-0.15	1 6.5	1.75	1.6
25	14 44.2	14 44.4	53 58.2	-0.02	53 58.8	+0.12	1 49.5	1.83	2.6
26	14 45.0	14 46.2	54 1.2	+0.28	54 5.5	0.44	2 34.6	1.93	3.6
27	14 47.9	14 50.2	54 11.8	0.60	54 20.1	0.78	3 22.1	2.04	4.6
28	14 53.1	14 56.5	54 30.7	0.97	54 43.5	1.16	4 12.1	2.13	5.6
29	15 0.7	15 5.4	54 58.6	1.35	55 16.0	1.54	5 3.9	2.18	6.6
30	15 10.7	15 16.7	55 35.6	1.73	55 57.4	1.91	5 56.6	2.20	7.6
31	15 23.2	15 30.2	56 21.3	2.07	56 47.0	2.21	6 49.4	2.18	8.6
32	15 37.6	15 45.4	57 14.3	+2.32	57 42.7	+2.40	7 41.4	2.15	9.6

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 1.					MONDAY 3.				
0	h m s	s	N. 26° 18' 2.8"	2.352	0	h m s	s	N. 25° 31' 10.3"	4.435
1	4 41 33.26	2.2599	26 20 20.0	2.221	1	6 32 54.05	2.3524	25 26 39.8	4.582
2	4 43 48.96	2.2633	26 22 29.3	2.090	2	6 35 15.20	2.3526	25 22 0.5	4.797
3	4 46 4.86	2.2668	26 24 30.8	1.958	3	6 37 36.36	2.3527	25 17 12.5	4.873
4	4 48 20.97	2.2702	26 26 24.3	1.825	4	6 39 57.52	2.3527	25 12 15.7	5.020
5	4 50 37.28	2.2735	26 28 9.8	1.691	5	6 42 18.68	2.3526	25 7 10.1	5.166
6	4 52 53.79	2.2767	26 29 47.2	1.557	6	6 44 39.83	2.3524	25 1 55.8	5.312
7	4 55 10.49	2.2799	26 31 16.6	1.422	7	6 47 0.97	2.3522	24 56 32.7	5.457
8	4 57 27.38	2.2831	26 32 37.9	1.287	8	6 49 22.10	2.3520	24 51 0.9	5.603
9	4 59 44.46	2.2862	26 33 51.0	1.151	9	6 51 43.21	2.3517	24 45 20.3	5.749
10	5 2 1.72	2.2892	26 34 56.0	1.015	10	6 54 4.30	2.3513	24 39 31.0	5.894
11	5 4 19.16	2.2921	26 35 52.8	0.878	11	6 56 25.36	2.3508	24 33 33.0	6.039
12	5 6 36.77	2.2950	26 36 41.4	0.741	12	6 58 46.40	2.3504	24 27 26.3	6.183
13	5 8 54.56	2.2978	26 37 21.7	0.603	13	7 1 7.41	2.3498	24 21 11.0	6.328
14	5 11 12.51	2.3006	26 37 53.7	0.464	14	7 3 28.38	2.3491	24 14 47.0	6.473
15	5 13 30.63	2.3033	26 38 17.4	0.326	15	7 5 49.30	2.3483	24 8 14.3	6.617
16	5 15 48.91	2.3060	26 38 32.8	0.187	16	7 8 10.18	2.3476	24 1 33.0	6.759
17	5 18 7.35	2.3086	26 38 39.8	+0.047	17	7 10 31.02	2.3468	23 54 43.2	6.902
18	5 20 25.94	2.3110	26 38 38.4	-0.093	18	7 12 51.80	2.3459	23 47 44.8	7.045
19	5 22 44.67	2.3134	26 38 28.6	0.234	19	7 15 12.53	2.3450	23 40 37.8	7.187
20	5 25 3.54	2.3158	26 38 10.3	0.376	20	7 17 33.20	2.3440	23 33 22.3	7.329
21	5 27 22.56	2.3182	26 37 43.5	0.517	21	7 19 53.81	2.3430	23 25 58.3	7.471
22	5 29 41.72	2.3204	26 37 8.2	0.659	22	7 22 14.36	2.3419	23 18 25.8	7.612
23	5 32 1.01	2.3225	N. 26° 36' 24.4"	0.801	23	7 24 34.84	2.3407	N. 23° 10' 44.9"	7.753
24	5 34 20.42	2.3246				7 26 55.25	2.3395		
SUNDAY 2.					TUESDAY 4.				
0	5 36 39.96	2.3268	26 35 32.1	0.943	0	7 29 15.58	2.3382	N. 23° 2' 55.5"	7.893
1	5 38 59.61	2.3285	26 34 31.2	1.087	1	7 31 35.84	2.3370	22 54 57.7	8.039
2	5 41 19.38	2.3304	26 33 21.7	1.230	2	7 33 56.02	2.3357	22 46 51.6	8.171
3	5 43 39.26	2.3322	26 32 3.6	1.373	3	7 36 16.12	2.3343	22 38 37.2	8.309
4	5 45 59.25	2.3339	26 30 36.9	1.517	4	7 38 36.13	2.3328	22 30 14.5	8.447
5	5 48 19.33	2.3355	26 29 1.5	1.662	5	7 40 56.06	2.3314	22 21 43.5	8.585
6	5 50 39.51	2.3371	26 27 17.4	1.807	6	7 43 15.90	2.3299	22 13 4.3	8.729
7	5 52 59.78	2.3386	26 25 24.6	1.952	7	7 45 35.65	2.3283	22 4 16.9	8.868
8	5 55 20.14	2.3400	26 23 23.2	2.096	8	7 47 55.30	2.3268	21 55 21.4	8.993
9	5 57 40.58	2.3413	26 21 13.1	2.241	9	7 50 14.86	2.3252	21 46 17.7	9.129
10	6 0 1.10	2.3426	26 18 54.3	2.387	10	7 52 34.32	2.3235	21 37 5.9	9.263
11	6 2 21.69	2.3438	26 16 26.7	2.532	11	7 54 53.68	2.3218	21 27 46.1	9.397
12	6 4 42.36	2.3450	26 13 50.4	2.678	12	7 57 12.94	2.3202	21 18 18.3	9.531
13	6 7 3.09	2.3460	26 11 5.3	2.824	13	7 59 32.10	2.3184	21 8 42.5	9.663
14	6 9 23.88	2.3469	26 8 11.5	2.970	14	8 1 51.15	2.3166	20 58 58.8	9.793
15	6 11 44.72	2.3478	26 5 8.9	3.117	15	8 4 10.09	2.3147	20 49 7.3	9.923
16	6 14 5.61	2.3486	26 1 57.5	3.262	16	8 6 28.92	2.3129	20 39 8.0	10.053
17	6 16 26.55	2.3493	25 58 37.4	3.408	17	8 8 47.64	2.3112	20 29 0.9	10.182
18	6 18 47.53	2.3500	25 55 8.5	3.555	18	8 11 6.26	2.3093	20 18 46.1	10.311
19	6 21 8.55	2.3506	25 51 30.8	3.702	19	8 13 24.76	2.3074	20 8 23.6	10.438
20	6 23 29.60	2.3511	25 47 44.3	3.848	20	8 15 43.15	2.3055	19 57 53.5	10.565
21	6 25 50.68	2.3516	25 43 49.0	3.995	21	8 18 1.42	2.3036	19 47 15.8	10.691
22	6 28 11.79	2.3519	25 39 44.9	4.142	22	8 20 19.58	2.3017	19 36 30.6	10.816
23	6 30 32.91	2.3522	25 35 32.0	4.288	23	8 22 37.62	2.2997	19 25 37.9	10.940
24	6 32 54.05	2.3524	N. 25° 31' 10.3"	4.435	24	8 24 55.55	2.2978	N. 19° 14' 37.8"	11.063

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 5.					FRIDAY 7.				
0	8 24 55.55	2.29778	N. 19 14 37.8	11.063	0	10 13 6.82	2.2196	N. 8 22 41.8	15.608
1	8 27 13.36	2.29858	19 3 30.3	11.186	1	10 15 19.97	2.2168	8 7 3.5	15.688
2	8 29 31.05	2.29938	18 52 15.5	11.307	2	10 17 33.07	2.2180	7 51 21.6	15.797
3	8 31 48.62	2.29918	18 40 53.5	11.437	3	10 19 46.13	2.2173	7 35 36.2	15.785
4	8 34 6.07	2.29898	18 29 24.3	11.546	4	10 21 59.15	2.2167	7 19 47.4	15.841
5	8 36 23.40	2.29879	18 17 48.0	11.664	5	10 24 12.14	2.2159	7 3 55.3	15.894
6	8 38 40.62	2.29860	18 6 4.6	11.769	6	10 26 25.10	2.2157	6 48 0.1	15.946
7	8 40 57.72	2.29840	17 54 14.2	11.868	7	10 28 38.03	2.2159	6 32 1.8	15.997
8	8 43 14.70	2.29819	17 42 16.9	12.013	8	10 30 50.93	2.2148	6 16 0.4	16.047
9	8 45 31.55	2.29798	17 30 12.7	12.198	9	10 33 3.81	2.2145	5 59 56.1	16.095
10	8 47 48.28	2.29779	17 18 1.6	12.349	10	10 35 16.67	2.2143	5 43 49.0	16.140
11	8 50 4.90	2.29760	17 5 43.7	12.354	11	10 37 29.52	2.2140	5 27 39.3	16.183
12	8 52 21.40	2.29740	16 53 19.1	12.465	12	10 39 42.35	2.2138	5 11 27.0	16.226
13	8 54 37.78	2.29720	16 40 47.9	12.574	13	10 41 55.17	2.2137	4 55 12.2	16.267
14	8 56 54.04	2.29701	16 28 10.2	12.682	14	10 44 7.99	2.2137	4 38 55.0	16.306
15	8 59 10.19	2.29682	16 15 26.0	12.790	15	10 46 20.82	2.2138	4 22 35.5	16.343
16	9 1 26.22	2.29663	16 2 35.4	12.897	16	10 48 33.65	2.2139	4 6 13.8	16.379
17	9 3 42.14	2.29644	15 49 38.4	13.003	17	10 50 46.49	2.2140	3 49 50.0	16.419
18	9 5 57.95	2.29625	15 36 35.1	13.107	18	10 52 59.33	2.2143	3 33 24.3	16.444
19	9 8 13.64	2.29606	15 23 25.6	13.209	19	10 55 12.19	2.2145	3 16 56.7	16.475
20	9 10 29.22	2.29587	15 10 10.0	13.311	20	10 57 25.07	2.2148	3 0 27.3	16.503
21	9 12 44.69	2.29569	14 56 48.3	13.419	21	10 59 37.96	2.2151	2 43 56.3	16.530
22	9 15 0.05	2.29551	14 43 20.6	13.511	22	11 1 50.88	2.2156	2 27 23.7	16.555
23	9 17 15.30	2.29533	N. 14 29 47.0	13.608	23	11 4 3.84	2.2163	N. 2 10 49.7	16.577
THURSDAY 6.					SATURDAY 8.				
0	9 19 30.44	2.29515	N. 14 16 7.6	13.705	0	11 6 16.83	2.2168	N. 1 54 14.4	16.598
1	9 21 45.48	2.29497	14 2 22.4	13.801	1	11 8 29.86	2.2175	1 37 37.9	16.618
2	9 24 0.41	2.29480	13 48 31.5	13.895	2	11 10 42.93	2.2182	1 21 0.2	16.637
3	9 26 15.24	2.29463	13 34 35.0	13.987	3	11 12 56.04	2.2189	1 4 21.5	16.653
4	9 28 29.97	2.29447	13 20 33.0	14.079	4	11 15 9.20	2.2198	0 47 41.9	16.667
5	9 30 44.60	2.29431	13 6 25.5	14.169	5	11 17 22.42	2.2208	0 31 1.6	16.678
6	9 32 59.14	2.29415	12 52 12.7	14.257	6	11 19 35.70	2.2218	N. 0 14 20.6	16.688
7	9 35 13.58	2.29399	12 37 54.6	14.345	7	11 21 49.04	2.2228	S. 0 2 20.9	16.696
8	9 37 27.93	2.29384	12 23 31.3	14.431	8	11 24 2.44	2.2239	0 19 2.9	16.703
9	9 39 42.19	2.29369	12 9 2.9	14.515	9	11 26 15.91	2.2250	0 35 45.3	16.708
10	9 41 56.36	2.29354	11 54 29.5	14.598	10	11 28 29.46	2.2264	0 52 27.9	16.711
11	9 44 10.44	2.29340	11 39 51.1	14.681	11	11 30 43.08	2.2277	1 9 10.6	16.719
12	9 46 24.44	2.29327	11 25 7.8	14.762	12	11 32 56.78	2.2291	1 25 53.3	16.711
13	9 48 38.36	2.29313	11 10 19.7	14.840	13	11 35 10.57	2.2306	1 42 35.9	16.708
14	9 50 52.20	2.29300	10 55 27.0	14.917	14	11 37 24.45	2.2321	1 59 18.2	16.703
15	9 53 5.96	2.29288	10 40 29.7	14.992	15	11 39 38.42	2.2337	2 16 0.2	16.697
16	9 55 19.65	2.29276	10 25 27.9	15.067	16	11 41 52.49	2.2353	2 32 41.8	16.688
17	9 57 33.27	2.29263	10 10 21.7	15.140	17	11 44 6.66	2.2370	2 49 22.8	16.677
18	9 59 46.81	2.29250	9 55 11.1	15.213	18	11 46 20.93	2.2388	3 6 3.1	16.665
19	10 2 0.29	2.29239	9 39 56.3	15.282	19	11 48 35.31	2.2407	3 22 42.6	16.651
20	10 4 13.71	2.29229	9 24 37.3	15.350	20	11 50 49.81	2.2427	3 39 21.2	16.635
21	10 6 27.07	2.29222	9 9 14.3	15.417	21	11 53 4.43	2.2447	3 55 58.8	16.617
22	10 8 40.37	2.29213	8 53 47.3	15.482	22	11 55 19.17	2.2467	4 12 35.3	16.597
23	10 10 53.62	2.29204	8 38 16.4	15.546	23	11 57 34.04	2.2488	4 29 10.5	16.575
24	10 13 6.82	2.29196	N. 8 22 41.8	15.608	24	11 59 49.03	2.2510	S. 4 45 44.3	16.550

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 9.					TUESDAY 11.				
0	h m s		S. ° ' "		0	h m s		S. ° ' "	
1	11 59 49.03	2.2510	4 45 44.3	16.559	1	13 51 26.49	2.4185	8. 16 56 12.9	13.181
2	12 2 4.16	2.2532	5 2 16.7	16.536	2	13 53 51.60	2.4207	17 9 19.1	13.045
3	12 4 19.42	2.2555	5 18 47.4	16.498	3	13 56 16.97	2.4249	17 22 18.3	12.998
4	12 6 34.82	2.2579	5 35 16.4	16.468	4	13 58 42.59	2.4291	17 35 10.5	12.910
5	12 8 50.37	2.2603	5 51 43.6	16.437	5	14 1 8.46	2.4333	17 47 55.5	12.869
6	12 11 6.06	2.2628	6 8 8.8	16.403	6	14 3 34.58	2.4375	18 0 33.2	12.867
7	12 13 21.91	2.2655	6 24 31.9	16.367	7	14 6 0.96	2.4417	18 13 3.6	12.844
8	12 15 37.92	2.2681	6 40 52.8	16.330	8	14 8 27.59	2.4459	18 25 26.5	12.818
9	12 17 54.08	2.2707	6 57 11.5	16.292	9	14 10 54.47	2.4500	18 37 41.8	12.199
10	12 20 10.40	2.2734	7 13 27.8	16.250	10	14 13 21.59	2.4541	18 49 49.5	12.063
11	12 22 26.89	2.2762	7 29 41.5	16.207	11	14 15 48.96	2.4582	19 1 49.4	11.933
12	12 24 43.55	2.2791	7 45 52.6	16.169	12	14 18 16.58	2.4624	19 13 41.5	11.809
13	12 27 0.38	2.2820	8 2 1.0	16.116	13	14 20 44.45	2.4665	19 25 25.6	11.688
14	12 29 17.39	2.2850	8 18 6.5	16.066	14	14 23 12.56	2.4706	19 37 1.7	11.534
15	12 31 34.58	2.2881	8 34 8.9	16.014	15	14 25 40.92	2.4747	19 48 20.7	11.398
16	12 33 51.96	2.2912	8 50 8.2	15.962	16	14 28 9.52	2.4787	19 59 40.5	11.261
17	12 36 9.52	2.2943	9 6 4.3	15.907	17	14 30 38.36	2.4828	20 11 1.0	11.132
18	12 38 27.27	2.2975	9 21 57.1	15.851	18	14 33 7.43	2.4868	20 22 4.1	10.999
19	12 40 45.22	2.3007	9 37 46.4	15.792	19	14 35 36.74	2.4904	20 32 58.8	10.841
20	12 43 3.36	2.3040	9 53 32.1	15.731	20	14 38 6.28	2.4943	20 43 45.0	10.697
21	12 45 21.70	2.3074	10 9 14.1	15.668	21	14 40 36.05	2.4982	20 54 22.5	10.559
22	12 47 40.25	2.3108	10 24 52.3	15.604	22	14 43 6.06	2.5021	21 4 51.3	10.407
23	12 49 59.00	2.3142	10 40 26.6	15.538	23	14 45 36.30	2.5058	21 15 11.3	10.260
24	12 52 17.96	2.3177	10 55 56.9	15.470	24	14 48 6.75	2.5094	21 25 22.5	10.119
MONDAY 10.					WEDNESDAY 12.				
0	12 54 37.13	2.3213	11 11 23.0	15.399	0	14 50 37.42	2.5130	21 35 24.7	9.982
1	12 56 56.52	2.3249	11 26 44.8	15.337	1	14 53 8.31	2.5166	21 45 17.9	9.811
2	12 59 16.12	2.3285	11 42 2.3	15.264	2	14 55 39.41	2.5201	21 55 2.0	9.659
3	13 1 35.94	2.3322	11 57 15.3	15.178	3	14 58 10.72	2.5236	22 4 37.0	9.507
4	13 3 55.98	2.3359	12 12 23.7	15.101	4	15 0 42.24	2.5270	22 14 2.8	9.359
5	13 6 16.25	2.3397	12 27 27.4	15.021	5	15 3 13.96	2.5303	22 23 19.2	9.196
6	13 8 36.74	2.3434	12 42 26.2	14.939	6	15 5 45.88	2.5336	22 32 26.3	9.040
7	13 10 57.46	2.3473	12 57 20.1	14.857	7	15 8 17.99	2.5368	22 41 24.0	8.889
8	13 13 18.41	2.3519	13 12 9.0	14.771	8	15 10 50.29	2.5399	22 50 12.2	8.743
9	13 15 39.60	2.3561	13 26 52.6	14.683	9	15 13 22.78	2.5430	22 58 50.8	8.603
10	13 18 1.02	2.3599	13 41 30.9	14.594	10	15 15 55.45	2.5459	23 7 19.8	8.469
11	13 20 22.68	2.3630	13 56 3.9	14.504	11	15 18 28.29	2.5488	23 15 39.1	8.341
12	13 22 44.58	2.3670	14 10 31.4	14.412	12	15 21 1.30	2.5516	23 23 48.7	8.215
13	13 25 6.72	2.3710	14 24 53.3	14.317	13	15 23 34.48	2.5543	23 31 48.5	8.078
14	13 27 29.10	2.3750	14 39 9.4	14.220	14	15 26 7.82	2.5570	23 39 38.5	7.951
15	13 29 51.72	2.3791	14 53 19.7	14.129	15	15 28 41.32	2.5596	23 47 18.6	7.825
16	13 32 14.59	2.3833	15 7 24.1	14.033	16	15 31 14.97	2.5620	23 54 48.7	7.718
17	13 34 37.71	2.3873	15 21 22.5	13.932	17	15 33 48.76	2.5643	24 2 8.8	7.629
18	13 37 1.07	2.3914	15 35 14.7	13.818	18	15 36 22.69	2.5666	24 9 18.9	7.504
19	13 39 24.68	2.3956	15 49 0.7	13.713	19	15 38 56.76	2.5688	24 16 18.9	7.391
20	13 41 48.54	2.3997	16 2 40.3	13.606	20	15 41 30.95	2.5708	24 23 8.7	7.246
21	13 44 12.65	2.4039	16 16 13.4	13.497	21	15 44 5.26	2.5728	24 29 48.4	7.077
22	13 46 37.01	2.4081	16 29 39.9	13.387	22	15 46 39.68	2.5747	24 36 17.9	6.906
23	13 49 1.62	2.4123	16 42 59.8	13.275	23	15 49 14.22	2.5765	24 42 37.1	6.735
24	13 51 26.49	2.4165	16 56 12.9	13.161	24	15 51 48.80	2.5781	24 48 46.1	6.604

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 13.					SATURDAY 15.				
0	15 51 48.86	2.5781	S. 24° 46' 46.1	6.064	0	17 55 9.64	2.5136	S. 26° 18' 42.0	2.932
1	15 54 23.59	2.5797	24 54 44.8	5.892	1	17 57 40.33	2.5093	26 16 23.2	2.394
2	15 56 58.42	2.5813	25 0 33.1	5.718	2	18 0 10.76	2.5049	26 13 54.7	2.554
3	15 59 33.33	2.5829	25 6 11.0	5.545	3	18 2 40.92	2.5004	26 11 16.7	2.713
4	16 2 8.31	2.5836	25 11 38.5	5.371	4	18 5 10.81	2.4959	26 8 20.1	2.872
5	16 4 43.36	2.5847	25 16 55.5	5.197	5	18 7 40.43	2.4919	26 5 32.0	3.031
6	16 7 18.47	2.5857	25 22 2.1	5.023	6	18 10 9.76	2.4884	26 2 25.4	3.188
7	16 9 53.64	2.5865	25 26 58.2	4.848	7	18 12 38.80	2.4817	25 59 9.4	3.343
8	16 12 28.85	2.5872	25 31 43.8	4.673	8	18 15 7.56	2.4768	25 55 44.2	3.498
9	16 15 4.10	2.5878	25 36 18.9	4.498	9	18 17 36.02	2.4718	25 52 9.7	3.653
10	16 17 39.39	2.5883	25 40 43.5	4.322	10	18 20 4.18	2.4667	25 48 26.0	3.804
11	16 20 14.70	2.5887	25 44 57.5	4.145	11	18 22 32.03	2.4616	25 44 33.2	3.956
12	16 22 50.03	2.5890	25 49 0.9	3.968	12	18 24 59.57	2.4563	25 40 31.3	4.107
13	16 25 25.37	2.5890	25 52 53.7	3.793	13	18 27 26.79	2.4510	25 36 20.4	4.257
14	16 28 0.71	2.5890	25 56 36.0	3.616	14	18 29 53.69	2.4457	25 32 0.5	4.405
15	16 30 36.05	2.5889	26 0 7.7	3.439	15	18 32 20.27	2.4403	25 27 31.8	4.552
16	16 33 11.38	2.5887	26 3 28.7	3.263	16	18 34 46.52	2.4347	25 22 54.3	4.698
17	16 35 46.69	2.5883	26 6 39.2	3.087	17	18 37 12.43	2.4290	25 18 8.0	4.843
18	16 38 21.97	2.5878	26 9 39.1	2.910	18	18 39 38.00	2.4233	25 13 13.1	4.987
19	16 40 57.22	2.5871	26 12 28.4	2.733	19	18 42 3.23	2.4177	25 8 9.6	5.139
20	16 43 32.42	2.5862	26 15 7.1	2.557	20	18 44 28.12	2.4119	25 2 57.0	5.271
21	16 46 7.57	2.5853	26 17 35.2	2.380	21	18 46 52.66	2.4061	24 57 37.1	5.412
22	16 48 42.66	2.5843	26 19 52.7	2.204	22	18 49 16.85	2.4002	24 52 8.2	5.551
23	16 51 17.69	2.5832	S. 26° 21' 59.7	2.028	23	18 51 40.69	2.3943	S. 24° 46' 31.0	5.687
FRIDAY 14.					SUNDAY 16.				
0	16 53 52.64	2.5818	S. 26° 23' 56.1	1.859	0	18 54 4.17	2.3883	S. 24° 40' 45.7	5.823
1	16 56 27.51	2.5804	26 25 41.9	1.676	1	18 56 27.29	2.3833	24 34 52.2	5.959
2	16 59 2.29	2.5789	26 27 17.2	1.501	2	18 58 50.05	2.3783	24 28 50.6	6.094
3	17 1 36.98	2.5772	26 28 42.0	1.326	3	19 1 12.45	2.3702	24 22 40.9	6.227
4	17 4 11.56	2.5754	26 29 56.3	1.151	4	19 3 34.48	2.3640	24 16 23.3	6.359
5	17 6 46.03	2.5734	26 31 0.1	0.977	5	19 5 56.13	2.3578	24 9 57.8	6.490
6	17 9 20.37	2.5713	26 31 53.5	0.802	6	19 8 17.41	2.3516	24 3 24.6	6.618
7	17 11 54.59	2.5692	26 32 36.4	0.628	7	19 10 38.32	2.3454	23 56 43.7	6.746
8	17 14 28.67	2.5668	26 33 8.9	0.456	8	19 12 58.86	2.3392	23 49 55.1	6.873
9	17 17 2.61	2.5644	26 33 31.1	0.283	9	19 15 19.02	2.3328	23 42 58.9	6.998
10	17 19 36.40	2.5618	26 33 42.9	-0.111	10	19 17 38.80	2.3265	23 35 55.3	7.122
11	17 22 10.03	2.5592	26 33 44.4	+0.061	11	19 19 58.20	2.3202	23 28 44.3	7.244
12	17 24 43.50	2.5564	26 33 35.6	0.232	12	19 22 17.23	2.3139	23 21 26.0	7.366
13	17 27 16.80	2.5535	26 33 16.5	0.402	13	19 24 35.87	2.3075	23 14 0.4	7.487
14	17 29 49.92	2.5503	26 32 47.3	0.572	14	19 26 54.13	2.3011	23 6 27.6	7.605
15	17 32 22.84	2.5471	26 32 7.9	0.741	15	19 29 12.00	2.2947	22 58 47.8	7.722
16	17 34 55.57	2.5438	26 31 18.4	0.910	16	19 31 29.49	2.2882	22 51 1.0	7.838
17	17 37 28.10	2.5405	26 30 18.7	1.079	17	19 33 46.59	2.2818	22 43 7.2	7.953
18	17 40 0.43	2.5370	26 29 8.9	1.247	18	19 36 3.31	2.2754	22 35 6.6	8.067
19	17 42 32.54	2.5333	26 27 49.1	1.413	19	19 38 19.64	2.2690	22 26 59.2	8.179
20	17 45 4.43	2.5296	26 26 19.4	1.578	20	19 40 35.59	2.2626	22 18 45.1	8.290
21	17 47 36.09	2.5257	26 24 39.8	1.743	21	19 42 51.15	2.2561	22 10 24.4	8.400
22	17 50 7.51	2.5217	26 22 50.3	1.907	22	19 45 6.32	2.2497	22 1 57.1	8.508
23	17 52 38.70	2.5177	26 20 51.0	2.069	23	19 47 21.11	2.2432	21 53 23.4	8.615
24	17 55 9.64	2.5136	S. 26° 18' 42.0	2.232	24	19 49 35.51	2.2368	S. 21° 44' 43.3	8.721



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 17.					WEDNESDAY 19.				
0	19 49 35.51	2.2368	S. 21° 44' 43.3"	8.791	0	21 30 2.77	1.9643	S. 13° 8' 12.9"	12.340
1	19 51 49.53	2.2304	21 35 56.9	8.896	1	21 32 0.49	1.9598	12 55 51.1	12.387
2	19 54 3.16	2.2240	21 27 4.2	8.999	2	21 33 57.95	1.9554	12 43 26.5	12.433
3	19 56 16.41	2.2177	21 18 5.4	9.030	3	21 35 55.14	1.9510	12 30 59.1	12.479
4	19 58 29.28	2.2112	21 9 0.6	9.131	4	21 37 52.07	1.9467	12 18 29.0	12.523
5	20 0 41.76	2.2048	20 59 49.7	9.231	5	21 39 48.75	1.9425	12 5 56.3	12.566
6	20 2 53.86	2.1985	20 50 32.9	9.328	6	21 41 45.17	1.9383	11 53 21.1	12.608
7	20 5 5.58	2.1922	20 41 10.3	9.425	7	21 43 41.34	1.9341	11 40 43.4	12.649
8	20 7 16.92	2.1859	20 31 41.9	9.521	8	21 45 37.26	1.9300	11 28 3.2	12.689
9	20 9 27.89	2.1797	20 22 7.8	9.615	9	21 47 32.94	1.9260	11 15 20.7	12.728
10	20 11 38.48	2.1733	20 12 28.1	9.707	10	21 49 28.38	1.9221	11 2 35.9	12.766
11	20 13 48.69	2.1670	20 2 42.9	9.798	11	21 51 23.59	1.9189	10 49 48.8	12.803
12	20 15 58.52	2.1608	19 52 52.3	9.888	12	21 53 18.56	1.9144	10 36 59.5	12.839
13	20 18 7.98	2.1547	19 42 56.3	9.977	13	21 55 13.31	1.9108	10 24 8.1	12.874
14	20 20 17.08	2.1486	19 32 55.0	10.066	14	21 57 7.83	1.9068	10 11 14.6	12.907
15	20 22 25.81	2.1424	19 22 48.4	10.153	15	21 59 2.13	1.9033	9 58 19.2	12.940
16	20 24 34.17	2.1363	19 12 36.6	10.238	16	22 0 56.22	1.8997	9 45 21.8	12.973
17	20 26 42.17	2.1302	19 2 19.8	10.322	17	22 2 50.09	1.8961	9 32 22.4	13.005
18	20 28 49.80	2.1242	18 51 58.0	10.404	18	22 4 43.75	1.8927	9 19 21.2	13.036
19	20 30 57.07	2.1182	18 41 31.3	10.486	19	22 6 37.21	1.8893	9 6 18.2	13.064
20	20 33 3.98	2.1122	18 30 59.7	10.567	20	22 8 30.47	1.8859	8 53 13.5	13.092
21	20 35 10.54	2.1063	18 20 23.3	10.646	21	22 10 23.52	1.8826	8 40 7.2	13.119
22	20 37 16.74	2.1004	18 9 42.2	10.723	22	22 12 16.38	1.8794	8 26 59.3	13.146
23	20 39 22.59	2.0947	S. 17° 58' 56.5"	10.800	23	22 14 9.05	1.8763	S. 8° 13' 49.7"	13.173
TUESDAY 18.					THURSDAY 20.				
0	20 41 28.10	2.0889	S. 17° 48' 6.2"	10.876	0	22 16 1.54	1.8733	S. 8° 0' 38.6"	13.197
1	20 43 33.26	2.0831	17 37 11.4	10.950	1	22 17 53.84	1.8703	7 47 26.1	13.220
2	20 45 38.07	2.0773	17 26 12.2	11.022	2	22 19 45.97	1.8673	7 34 12.2	13.243
3	20 47 42.54	2.0717	17 15 8.7	11.094	3	22 21 37.92	1.8644	7 20 57.0	13.264
4	20 49 46.67	2.0661	17 4 0.9	11.165	4	22 23 29.70	1.8616	7 7 40.5	13.285
5	20 51 50.47	2.0605	16 52 48.9	11.235	5	22 25 21.31	1.8588	6 54 22.8	13.306
6	20 53 53.93	2.0549	16 41 32.7	11.303	6	22 27 12.76	1.8562	6 41 3.8	13.326
7	20 55 57.06	2.0495	16 30 12.5	11.370	7	22 29 4.05	1.8536	6 27 43.7	13.343
8	20 57 59.87	2.0441	16 18 48.3	11.436	8	22 30 55.18	1.8509	6 14 22.6	13.360
9	21 0 2.35	2.0387	16 7 20.2	11.501	9	22 32 46.16	1.8485	6 1 0.5	13.377
10	21 2 4.51	2.0334	15 55 48.2	11.565	10	22 34 37.00	1.8461	5 47 37.4	13.392
11	21 4 6.35	2.0281	15 44 12.4	11.627	11	22 36 27.69	1.8437	5 34 13.4	13.407
12	21 6 7.88	2.0228	15 32 32.9	11.688	12	22 38 18.24	1.8414	5 20 48.6	13.420
13	21 8 9.09	2.0177	15 20 49.8	11.749	13	22 40 8.66	1.8392	5 7 23.0	13.434
14	21 10 10.00	2.0126	15 9 3.0	11.809	14	22 41 58.94	1.8369	4 53 56.6	13.447
15	21 12 10.60	2.0074	14 57 12.7	11.867	15	22 43 49.09	1.8348	4 40 29.4	13.458
16	21 14 10.89	2.0024	14 45 19.0	11.923	16	22 45 39.12	1.8328	4 27 1.6	13.468
17	21 16 10.89	1.9975	14 33 21.9	11.979	17	22 47 29.03	1.8308	4 13 33.3	13.477
18	21 18 10.59	1.9926	14 21 21.5	12.033	18	22 49 18.81	1.8288	4 0 4.4	13.486
19	21 20 10.00	1.9877	14 9 17.9	12.087	19	22 51 8.48	1.8270	3 46 35.0	13.493
20	21 22 9.12	1.9829	13 57 11.0	12.141	20	22 52 58.05	1.8252	3 33 5.2	13.500
21	21 24 7.95	1.9782	13 45 1.0	12.192	21	22 54 47.51	1.8235	3 19 35.0	13.507
22	21 26 6.50	1.9735	13 32 48.0	12.242	22	22 56 36.87	1.8218	3 6 4.4	13.518
23	21 28 4.77	1.9689	13 20 31.9	12.292	23	22 58 26.13	1.8202	2 52 33.5	13.517
24	21 30 2.77	1.9643	S. 13° 8' 12.9"	12.340	24	23 0 15.29	1.8186	S. 2° 39' 2.4"	13.520

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 21.					SUNDAY 23.				
0	<sup>h</sup> 23 <sup>m</sup> 0 <sup>s</sup> 15.29	1.8186	S. 2° 30' 24"	13.580	0	<sup>h</sup> 0 26 56.05	1.8157	N. 7° 58' 58.5"	12.786
1	23 2 4.36	1.8179	2 25 31.1	13.583	1	0 28 45.03	1.8171	8 11 43.4	12.731
2	23 3 53.35	1.8157	2 11 59.7	13.525	2	0 30 34.10	1.8186	8 24 26.2	12.686
3	23 5 42.25	1.8143	1 58 28.1	13.527	3	0 32 23.26	1.8200	8 37 6.9	12.660
4	23 7 31.07	1.8131	1 44 55.5	13.527	4	0 34 12.50	1.8214	8 49 45.4	12.632
5	23 9 19.82	1.8119	1 31 24.9	13.526	5	0 36 1.83	1.8230	9 2 21.6	12.585
6	23 11 8.50	1.8107	1 17 53.4	13.524	6	0 37 51.26	1.8247	9 14 55.6	12.547
7	23 12 57.11	1.8096	1 4 22.0	13.522	7	0 39 40.79	1.8263	9 27 27.3	12.508
8	23 14 45.65	1.8085	0 50 50.7	13.520	8	0 41 30.42	1.8280	9 39 56.6	12.468
9	23 16 34.13	1.8076	0 37 19.6	13.517	9	0 43 20.15	1.8298	9 52 23.4	12.427
10	23 18 22.50	1.8067	0 23 48.7	13.519	10	0 45 9.90	1.8316	10 4 47.8	12.386
11	23 20 10.93	1.8058	S. 0 10 18.1	13.507	11	0 46 59.94	1.8334	10 17 9.7	12.344
12	23 21 59.25	1.8050	N. 0 3 12.1	13.500	12	0 48 50.00	1.8353	10 29 29.1	12.303
13	23 23 47.53	1.8042	0 16 41.9	13.493	13	0 50 40.18	1.8373	10 41 45.9	12.258
14	23 25 35.76	1.8035	0 30 11.3	13.486	14	0 52 30.48	1.8393	10 54 0.0	12.213
15	23 27 23.95	1.8029	0 43 40.2	13.477	15	0 54 20.90	1.8414	11 6 11.5	12.169
16	23 29 12.11	1.8024	0 57 8.6	13.468	16	0 56 11.45	1.8436	11 18 20.3	12.123
17	23 31 0.24	1.8019	1 10 36.4	13.458	17	0 58 2.13	1.8457	11 30 26.3	12.076
18	23 32 48.34	1.8014	1 24 3.6	13.447	18	0 59 52.93	1.8479	11 42 29.4	12.028
19	23 34 36.41	1.8011	1 37 30.1	13.436	19	1 1 43.87	1.8503	11 54 29.7	11.981
20	23 36 24.47	1.8008	1 50 55.9	13.423	20	1 3 34.95	1.8528	12 6 27.1	11.933
21	23 38 12.51	1.8005	2 4 20.9	13.410	21	1 5 26.17	1.8548	12 18 21.5	11.889
22	23 40 0.53	1.8003	2 17 45.1	13.397	22	1 7 17.53	1.8572	12 30 12.9	11.831
23	23 41 48.55	1.8002	N. 2 31 8.5	13.382	23	1 9 9.03	1.8596	N. 12 42 1.2	11.780
SATURDAY 22.					MONDAY 24.				
0	23 43 36.58	1.8002	N. 2 44 31.0	13.367	0	1 11 0.68	1.8621	N. 12 53 46.5	11.728
1	23 45 24.57	1.8002	2 57 52.5	13.350	1	1 12 52.48	1.8647	13 5 28.6	11.675
2	23 47 12.58	1.8002	3 11 13.0	13.333	2	1 14 44.44	1.8672	13 17 7.5	11.622
3	23 49 0.59	1.8002	3 24 32.5	13.316	3	1 16 36.55	1.8698	13 28 43.3	11.569
4	23 50 48.61	1.8004	3 37 50.9	13.297	4	1 18 28.82	1.8725	13 40 15.8	11.513
5	23 52 36.64	1.8007	3 51 8.1	13.277	5	1 20 21.25	1.8752	13 51 44.9	11.457
6	23 54 24.69	1.8000	4 4 24.1	13.257	6	1 22 13.84	1.8779	14 3 10.7	11.401
7	23 56 12.75	1.8013	4 17 38.9	13.236	7	1 24 6.60	1.8807	14 14 33.0	11.343
8	23 58 0.84	1.8017	4 30 52.4	13.216	8	1 25 59.53	1.8836	14 25 51.9	11.286
9	23 59 48.95	1.8021	4 44 4.7	13.193	9	1 27 52.63	1.8864	14 37 7.3	11.228
10	0 1 37.09	1.8027	4 57 15.6	13.169	10	1 29 45.00	1.8893	14 48 19.2	11.168
11	0 3 25.27	1.8032	5 10 25.0	13.145	11	1 31 39.35	1.8923	14 59 27.4	11.107
12	0 5 13.48	1.8038	5 23 33.0	13.121	12	1 33 32.98	1.8953	15 10 32.0	11.046
13	0 7 1.73	1.8045	5 36 39.5	13.096	13	1 35 26.79	1.8984	15 21 32.9	10.984
14	0 8 50.02	1.8053	5 49 44.4	13.068	14	1 37 20.79	1.9015	15 32 30.1	10.922
15	0 10 38.36	1.8061	6 2 47.7	13.042	15	1 39 14.97	1.9046	15 43 23.5	10.858
16	0 12 26.75	1.8069	6 15 49.4	13.014	16	1 41 9.34	1.9077	15 54 13.0	10.793
17	0 14 15.19	1.8078	6 28 49.4	12.986	17	1 43 3.00	1.9108	16 4 58.7	10.729
18	0 16 3.00	1.8088	6 41 47.7	12.957	18	1 44 58.64	1.9140	16 15 40.5	10.663
19	0 17 52.55	1.8098	6 54 44.2	12.927	19	1 46 53.58	1.9173	16 26 18.3	10.597
20	0 19 40.77	1.8109	7 7 38.9	12.896	20	1 48 48.72	1.9207	16 36 52.1	10.529
21	0 21 29.56	1.8121	7 20 31.7	12.864	21	1 50 44.06	1.9240	16 47 21.8	10.461
22	0 23 18.32	1.8132	7 33 22.6	12.832	22	1 52 39.60	1.9273	16 57 47.4	10.392
23	0 25 7.15	1.8144	7 46 11.5	12.799	23	1 54 35.34	1.9307	17 8 8.9	10.323
24	0 26 56.05	1.8157	N. 7 58 58.5	12.766	24	1 56 31.29	1.9342	N. 17 18 26.2	10.252

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 25.					THURSDAY 27.				
0	1 56 31.29	1.9349	N.17 18 26.2	10.362	0	3 33 42.27	2.1186	N.23 54 43.4	5.965
1	1 58 27.44	1.9376	17 28 39.2	10.181	1	3 35 40.51	2.1237	24 0 38.1	5.857
2	2 0 23.80	1.9411	17 38 47.9	10.109	2	3 37 56.09	2.1266	24 6 26.2	5.748
3	2 2 20.37	1.9446	17 48 52.3	10.037	3	3 40 4.70	2.1304	24 12 7.8	5.638
4	2 4 17.15	1.9482	17 58 52.3	9.963	4	3 42 12.64	2.1349	24 17 42.8	5.528
5	2 6 14.15	1.9517	18 8 47.9	9.889	5	3 44 20.80	2.1379	24 23 11.2	5.418
6	2 8 11.36	1.9553	18 18 39.0	9.814	6	3 46 29.19	2.1417	24 28 33.0	5.307
7	2 10 8.79	1.9590	18 28 25.6	9.738	7	3 48 37.80	2.1454	24 33 48.1	5.195
8	2 12 6.44	1.9626	18 38 7.6	9.661	8	3 50 46.64	2.1492	24 38 56.4	5.083
9	2 14 4.30	1.9663	18 47 44.9	9.583	9	3 52 55.70	2.1528	24 43 58.0	4.970
10	2 16 2.38	1.9699	18 57 17.6	9.506	10	3 55 4.98	2.1565	24 48 52.8	4.856
11	2 18 0.69	1.9737	19 6 45.6	9.427	11	3 57 14.48	2.1601	24 53 40.7	4.740
12	2 19 59.22	1.9774	19 16 8.8	9.347	12	3 59 24.19	2.1637	24 58 21.6	4.624
13	2 21 57.98	1.9819	19 26 27.2	9.267	13	4 1 34.12	2.1673	25 2 55.6	4.508
14	2 23 56.96	1.9849	19 34 40.8	9.186	14	4 3 44.20	2.1707	25 7 22.6	4.392
15	2 25 56.17	1.9887	19 43 49.5	9.103	15	4 5 54.61	2.1749	25 11 42.7	4.276
16	2 27 55.61	1.9926	19 52 53.2	9.020	16	4 8 5.17	2.1777	25 15 55.7	4.158
17	2 29 55.28	1.9964	20 1 51.9	8.937	17	4 10 15.94	2.1819	25 20 1.6	4.039
18	2 31 55.18	2.0002	20 10 45.6	8.853	18	4 12 26.92	2.1847	25 24 0.4	3.920
19	2 33 55.31	2.0041	20 19 34.2	8.768	19	4 14 38.10	2.1880	25 27 52.0	3.800
20	2 35 55.67	2.0080	20 28 17.7	8.682	20	4 16 49.48	2.1913	25 31 36.4	3.680
21	2 37 56.27	2.0119	20 36 56.0	8.594	21	4 19 1.05	2.1945	25 35 13.6	3.559
22	2 39 57.10	2.0158	20 45 29.0	8.507	22	4 21 12.82	2.1977	25 38 43.5	3.437
23	2 41 58.17	2.0197	N.20 53 56.6	8.419	23	4 23 24.78	2.2009	N.25 42 6.1	3.315
WEDNESDAY 26.					FRIDAY 28.				
0	2 43 59.47	2.0237	N.21 2 19.3	8.330	0	4 25 36.93	2.2041	N.25 45 21.3	3.193
1	2 46 1.01	2.0277	21 10 36.4	8.240	1	4 27 49.27	2.2072	25 48 29.2	3.070
2	2 48 2.79	2.0316	21 18 48.1	8.150	2	4 30 1.79	2.2103	25 51 29.7	2.946
3	2 50 4.80	2.0355	21 26 54.4	8.058	3	4 32 14.50	2.2133	25 54 22.7	2.821
4	2 52 7.05	2.0395	21 34 55.1	7.966	4	4 34 27.39	2.2162	25 57 8.2	2.696
5	2 54 9.54	2.0435	21 42 50.3	7.873	5	4 36 40.45	2.2192	25 59 46.2	2.571
6	2 56 12.27	2.0475	21 50 39.9	7.780	6	4 38 53.09	2.2221	26 2 16.7	2.445
7	2 58 15.24	2.0515	21 58 23.9	7.685	7	4 41 7.10	2.2248	26 4 39.6	2.318
8	3 0 18.45	2.0555	22 6 2.1	7.589	8	4 43 20.67	2.2276	26 6 54.9	2.191
9	3 2 21.90	2.0596	22 13 34.6	7.493	9	4 45 34.41	2.2303	26 9 2.5	2.063
10	3 4 25.59	2.0635	22 21 1.3	7.397	10	4 47 48.31	2.2329	26 11 2.5	1.936
11	3 6 29.52	2.0674	22 28 22.2	7.300	11	4 50 2.36	2.2355	26 12 54.8	1.807
12	3 8 33.68	2.0713	22 35 37.3	7.202	12	4 52 16.57	2.2381	26 14 39.4	1.678
13	3 10 38.08	2.0754	22 42 46.5	7.103	13	4 54 30.93	2.2406	26 16 16.2	1.549
14	3 12 42.73	2.0795	22 49 49.6	7.002	14	4 56 45.44	2.2431	26 17 45.3	1.420
15	3 14 47.62	2.0835	22 56 46.7	6.902	15	4 59 0.10	2.2455	26 19 6.6	1.289
16	3 16 52.75	2.0874	23 3 37.8	6.801	16	5 1 14.90	2.2478	26 20 20.0	1.158
17	3 18 58.11	2.0913	23 10 32.8	6.699	17	5 3 29.83	2.2500	26 21 25.6	1.027
18	3 21 3.71	2.0953	23 17 1.7	6.597	18	5 5 44.90	2.2522	26 22 23.3	0.896
19	3 23 9.55	2.0992	23 23 34.4	6.493	19	5 8 0.10	2.2544	26 23 13.1	0.764
20	3 25 15.62	2.1033	23 30 0.8	6.388	20	5 10 15.43	2.2565	26 23 55.0	0.633
21	3 27 21.93	2.1072	23 36 21.0	6.283	21	5 12 30.88	2.2585	26 24 28.9	0.499
22	3 29 28.48	2.1111	23 42 34.8	6.178	22	5 14 46.45	2.2605	26 24 54.8	0.366
23	3 31 35.26	2.1149	23 48 42.3	6.073	23	5 17 2.14	2.2624	26 25 12.8	0.233
24	3 33 42.27	2.1188	N.23 54 43.4	5.965	24	5 19 17.94	2.2642	N.26 25 22.8	+0.100

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 29.					MONDAY 31.				
0	5 19 17.94	9.9642	N.26 25 22.8	+0.100	0	7 8 54.94	9.9804	N.23 52 59.3	6.451
1	5 21 33.85	9.9660	26 25 24.8	-0.034	1	7 11 11.74	9.9794	23 46 28.2	6.585
2	5 23 49.86	9.9677	26 25 18.7	0.169	2	7 13 28.47	9.9783	23 39 49.1	6.718
3	5 26 5.98	9.9694	26 25 4.5	0.303	3	7 15 45.14	9.9773	23 33 2.1	6.850
4	5 28 22.19	9.9710	26 24 42.3	0.438	4	7 18 1.74	9.9762	23 26 7.1	6.983
5	5 30 38.50	9.9726	26 24 11.9	0.574	5	7 20 18.28	9.9751	23 19 4.1	7.116
6	5 32 54.90	9.9740	26 23 33.4	0.709	6	7 22 34.75	9.9739	23 11 53.2	7.248
7	5 35 11.38	9.9753	26 22 46.8	0.844	7	7 24 51.15	9.9727	23 4 34.4	7.379
8	5 37 27.94	9.9767	26 21 52.1	0.980	8	7 27 7.47	9.9714	22 57 7.7	7.511
9	5 39 44.59	9.9781	26 20 49.2	1.117	9	7 29 23.72	9.9702	22 49 33.1	7.642
10	5 42 1.31	9.9793	26 19 38.1	1.252	10	7 31 39.89	9.9689	22 41 50.6	7.773
11	5 44 18.10	9.9803	26 18 18.9	1.388	11	7 33 55.99	9.9677	22 34 0.4	7.902
12	5 46 34.95	9.9814	26 16 51.5	1.525	12	7 36 12.01	9.9663	22 26 2.4	8.032
13	5 48 51.87	9.9825	26 15 15.9	1.662	13	7 38 27.94	9.9649	22 17 56.6	8.161
14	5 51 8.85	9.9834	26 13 32.0	1.800	14	7 40 43.79	9.9635	22 9 43.1	8.288
15	5 53 25.88	9.9842	26 11 30.9	1.937	15	7 42 59.56	9.9621	22 1 22.0	8.416
16	5 55 42.96	9.9851	26 9 39.6	2.073	16	7 45 15.24	9.9606	21 52 53.2	8.543
17	5 58 0.09	9.9859	26 7 31.1	2.211	17	7 47 30.83	9.9592	21 44 16.8	8.671
18	6 0 17.27	9.9867	26 5 14.3	2.348	18	7 49 46.34	9.9577	21 35 32.7	8.797
19	6 2 34.49	9.9873	26 2 49.3	2.486	19	7 52 1.76	9.9562	21 26 41.1	8.922
20	6 4 51.74	9.9878	26 0 16.0	2.623	20	7 54 17.09	9.9547	21 17 42.0	9.048
21	6 7 9.02	9.9883	25 57 34.5	2.761	21	7 56 32.32	9.9531	21 8 35.3	9.174
22	6 9 26.33	9.9888	25 54 44.7	2.899	22	7 58 47.46	9.9516	20 59 21.1	9.298
23	6 11 43.67	9.9892	N.25 51 46.6	3.037	23	8 1 2.51	9.9501	N.20 49 59.6	9.420
SUNDAY 30.					TUESDAY, APRIL 1.				
0	6 14 1.03	9.9894	N.25 48 40.3	3.174	0	8 3 17.47	9.9485	N.20 40 30.7	9.543
1	6 16 18.40	9.9897	25 45 25.7	3.312	PHASES OF THE MOON.				
2	6 18 35.79	9.9899	25 42 2.8	3.450					
3	6 20 53.19	9.9901	25 38 31.7	3.587					
4	6 23 10.60	9.9902	25 34 52.3	3.725					
5	6 25 28.01	9.9902	25 31 4.7	3.863	☉ Full Moon, . . . 8 1 9.5 ☾ Last Quarter, . . 14 15 41.2 ● New Moon, . . . 22 9 4.4 ☾ First Quarter, . . 30 13 4.7				
6	6 27 45.42	9.9901	25 27 8.8	4.001					
7	6 30 2.82	9.9900	25 23 4.6	4.138					
8	6 32 20.22	9.9899	25 18 52.2	4.275					
9	6 34 37.61	9.9897	25 14 31.6	4.412	☾ Perigee, . . . . 9 13.0 ☾ Apogee, . . . . 25 1.4				
10	6 36 54.98	9.9894	25 10 2.7	4.550					
11	6 39 12.33	9.9891	25 5 25.6	4.688					
12	6 41 29.67	9.9887	25 0 40.2	4.825					
13	6 43 46.98	9.9882	24 55 46.6	4.961					
14	6 46 4.26	9.9877	24 50 44.9	5.097					
15	6 48 21.51	9.9872	24 45 35.0	5.233					
16	6 50 38.73	9.9867	24 40 16.9	5.370					
17	6 52 55.91	9.9861	24 34 50.6	5.506					
18	6 55 13.06	9.9854	24 29 16.2	5.641					
19	6 57 30.16	9.9847	24 23 33.7	5.777					
20	6 59 47.22	9.9839	24 17 43.0	5.912					
21	7 2 4.23	9.9831	24 11 44.2	6.047					
22	7 4 21.19	9.9822	24 5 37.3	6.182					
23	7 6 38.09	9.9813	23 59 22.3	6.317					
24	7 8 54.94	9.9804	N.23 52 59.3	6.451					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W. 91° 52' 21"	3314	93° 16' 16"	3301	94° 40' 26"	3368	96° 4' 52"	3374
	α Arietis	W. 36 39 17	2977	38 9 59	2962	39 40 59	2947	41 12 18	2933
	Pollux	E. 39 1 15	2989	37 30 49	2923	36 0 14	2974	34 29 29	2967
	Regulus	E. 75 43 7	2940	74 11 39	2929	72 39 57	2917	71 8 0	2904
2	Sun	W. 103 11 11	3199	104 37 21	3183	106 3 50	3167	107 30 39	3150
	α Arietis	W. 48 53 37	2856	50 26 52	2840	52 0 28	2823	53 34 26	2806
	Regulus	E. 63 24 0	2835	61 50 18	2821	60 16 17	2805	58 41 56	2790
	Spica	E. 117 27 3	2837	115 53 23	2822	114 19 24	2807	112 45 5	2791
3	Sun	W. 114 49 55	3061	116 18 52	3043	117 48 11	3024	119 17 54	3005
	α Arietis	W. 61 29 47	2790	63 6 0	2702	64 42 37	2684	66 19 38	2668
	Aldebaran	W. 30 17 37	2947	31 48 56	2909	33 21 4	2873	34 53 58	2859
	Regulus	E. 50 45 1	2709	49 8 33	2692	47 31 42	2675	45 54 28	2657
	Spica	E. 104 48 10	2707	103 11 40	2680	101 34 47	2672	99 57 30	2655
4	Sun	W. 126 52 23	2909	128 24 30	2891	129 57 1	2871	131 29 57	2852
	α Arietis	W. 74 30 53	2574	76 10 24	2556	77 50 20	2537	79 30 42	2517
	Aldebaran	W. 42 48 45	2692	44 25 36	2666	46 3 2	2640	47 41 2	2615
	Regulus	E. 37 42 27	2570	36 2 51	2558	34 22 51	2536	32 42 28	2519
	Spica	E. 91 45 0	2564	90 5 15	2545	88 25 5	2527	86 44 29	2509
5	α Arietis	W. 87 59 4	2486	89 42 2	2408	91 25 25	2390	93 9 14	2373
	Aldebaran	W. 55 59 14	2501	57 40 26	2479	59 22 9	2458	61 4 21	2438
	Pollux	W. 14 2 52	2752	15 38 23	2666	17 15 49	2600	18 54 44	2546
	Spica	E. 78 15 4	2417	76 31 53	2399	74 48 17	2381	73 4 15	2364
	Antares	E. 124 2 3	2411	122 18 44	2393	120 34 59	2375	118 50 48	2357
6	α Arietis	W. 101 54 31	2289	103 40 46	2274	105 27 24	2258	107 14 25	2244
	Aldebaran	W. 69 42 19	2344	71 27 15	2296	73 12 36	2269	74 58 22	2254
	Pollux	W. 27 24 53	2269	29 9 14	2242	30 54 13	2217	32 39 47	2205
	Spica	E. 64 17 57	2280	62 31 28	2265	60 44 37	2250	58 57 24	2235
	Antares	E. 110 3 39	2273	108 17 0	2258	106 29 58	2242	104 42 33	2227
7	Aldebaran	W. 83 52 50	2222	85 40 45	2209	87 28 59	2197	89 17 31	2186
	Pollux	W. 41 35 5	2204	43 23 26	2189	45 12 10	2175	47 1 15	2161
	Spica	E. 49 56 3	2169	48 6 49	2157	46 17 17	2147	44 27 29	2136
	Antares	E. 95 40 4	2159	93 50 34	2147	92 0 46	2135	90 10 40	2124
8	Aldebaran	W. 98 23 56	2142	100 13 51	2136	102 3 56	2130	103 54 9	2126
	Pollux	W. 56 11 17	2108	58 2 4	2099	59 53 4	2092	61 44 15	2085
	Regulus	W. 19 9 26	2118	20 59 57	2104	22 50 50	2092	24 42 1	2083
	Spica	E. 35 14 58	2097	33 23 54	2092	31 32 42	2088	29 41 24	2085
	Antares	E. 80 56 17	2078	79 4 44	2071	77 13 0	2065	75 21 7	2059
9	Pollux	W. 71 2 23	2064	72 54 18	2061	74 46 17	2060	76 38 18	2059
	Regulus	W. 34 0 53	2055	35 53 2	2052	37 45 16	2050	39 37 33	2048
	Antares	E. 65 59 48	2041	64 7 17	2039	62 14 43	2038	60 22 8	2037
	Mars	E. 111 19 18	2235	109 32 12	2233	107 45 3	2232	105 57 53	2229
10	Pollux	W. 85 58 12	2068	87 50 1	2071	89 41 44	2075	91 33 21	2081
	Regulus	W. 48 59 1	2054	50 51 11	2058	52 43 15	2062	54 35 13	2066
	Antares	E. 50 59 28	2047	49 7 7	2050	47 14 51	2055	45 22 42	2060



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>b</sup> .	P. L. of Diff.	VI <sup>b</sup> .	P. L. of Diff.	IX <sup>b</sup> .	P. L. of Diff.
10	Mars E.	97 2 19	2262	95 15 23	2266	93 28 32	2270	91 41 46	2275
	$\alpha$ Aquilæ E.	103 52 56	2685	102 15 56	2679	100 38 48	2676	99 1 36	2675
11	Pollux W.	100 49 10	2115	102 39 47	2124	104 30 10	2133	106 20 19	2143
	Regulus W.	63 52 58	2098	65 44 0	2107	67 34 49	2116	69 25 24	2125
	Antares E.	36 4 11	2004	34 13 2	2103	32 22 5	2111	30 31 22	2120
	Mars E.	82 50 22	2311	81 4 38	2319	79 19 6	2328	77 33 48	2338
	$\alpha$ Aquilæ E.	90 55 53	2693	89 19 4	2702	87 42 27	2712	86 6 3	2724
	Sun E.	138 25 28	2415	136 42 15	2423	134 59 13	2431	133 16 23	2440
12	Pollux W.	115 27 10	2198	117 15 41	2210	119 3 53	2223	120 51 46	2236
	Regulus W.	78 34 41	2176	80 23 44	2188	82 12 30	2200	84 0 58	2211
	Spica W.	24 36 48	2204	26 25 9	2212	28 13 19	2220	30 1 17	2229
	Mars E.	68 51 0	2393	67 7 15	2405	65 23 48	2417	63 40 38	2431
	$\alpha$ Aquilæ E.	78 8 41	2607	76 34 22	2628	75 0 30	2650	73 27 7	2675
	Jupiter E.	100 16 39	2245	98 29 18	2257	96 42 15	2270	94 55 31	2288
	Sun E.	124 45 38	2423	123 4 15	2505	121 23 9	2517	119 42 20	2530
13	Regulus W.	92 58 42	2276	94 45 17	2289	96 31 32	2302	98 17 28	2316
	Spica W.	38 57 16	2285	40 43 37	2298	42 29 40	2311	44 15 24	2324
	Mars E.	55 9 30	2498	53 28 14	2519	51 47 18	2536	50 6 41	2550
	$\alpha$ Aquilæ E.	65 48 49	2625	64 19 7	2661	62 50 10	2701	61 22 1	2748
	Jupiter E.	86 6 26	2346	84 21 34	2360	82 37 2	2374	80 52 50	2387
	Sun E.	111 22 47	2598	109 43 49	2612	108 5 10	2626	106 26 51	2640
14	Regulus W.	107 2 7	2386	108 46 2	2399	110 29 38	2413	112 12 54	2427
	Spica W.	52 59 21	2389	54 43 11	2403	56 26 42	2416	58 9 54	2430
	Mars E.	41 48 37	2614	40 10 1	2628	38 31 44	2643	36 53 47	2657
	$\alpha$ Aquilæ E.	54 14 41	2393	52 52 17	2454	51 31 2	2521	50 11 1	2593
	Jupiter E.	72 16 48	2458	70 34 36	2472	68 52 44	2487	67 11 12	2501
	Sun E.	98 20 10	2715	96 43 50	2729	95 7 49	2744	93 32 8	2759
15	Spica W.	66 41 4	2497	68 22 21	2510	70 3 20	2523	71 44 1	2536
	Antares W.	20 51 23	2491	22 32 49	2504	24 13 57	2517	25 54 47	2530
	Mars E.	28 48 58	2730	27 12 58	2744	25 37 17	2758	24 1 54	2772
	Jupiter E.	58 48 28	2571	57 8 53	2585	55 29 38	2599	53 50 42	2612
	Sun E.	85 38 35	2834	84 4 51	2848	82 31 25	2862	80 58 18	2876
16	Spica W.	80 2 59	2599	81 41 55	2612	83 20 34	2624	84 58 57	2636
	Antares W.	34 14 25	2583	35 53 29	2606	37 32 16	2618	39 10 47	2630
	Jupiter E.	45 40 37	2680	44 3 30	2693	42 26 41	2706	40 50 9	2719
	Sun E.	73 17 13	2946	71 45 53	2960	70 14 50	2973	68 44 4	2986
17	Spica W.	93 6 53	2693	94 43 43	2704	96 20 18	2714	97 56 39	2725
	Antares W.	47 19 22	2687	48 56 19	2698	50 33 2	2708	52 9 31	2719
	Jupiter E.	32 51 49	2784	31 17 0	2797	29 42 28	2811	28 8 14	2824
	Sun E.	61 14 17	3051	59 45 7	3063	58 16 12	3075	56 47 32	3087
18	Spica W.	105 54 59	2775	107 30 0	2785	109 4 48	2794	110 39 24	2803
	Antares W.	60 8 31	2769	61 43 40	2778	63 18 37	2787	64 53 22	2797
	Sun E.	49 27 46	3145	48 0 31	3156	46 33 29	3168	45 6 41	3178
19	Antares W.	72 44 10	2839	74 17 47	2848	75 51 13	2855	77 24 20	2863

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Mars	E.	89 55 12	2281	88 8 44	2287	86 22 26	2294	84 36 18	2302
	α Aquilæ	E.	97 24 22	2675	95 47 8	2677	94 9 57	2681	92 32 51	2687
11	Pollux	W.	108 10 13	2153	109 59 52	2163	111 49 15	2174	113 38 21	2186
	Regulus	W.	71 15 45	2134	73 5 52	2144	74 55 44	2154	76 45 21	2165
	Antares	E.	28 40 53	2130	26 50 39	2140	25 0 40	2150	23 10 57	2161
	Mars	E.	75 48 44	2348	74 3 54	2359	72 19 20	2370	70 35 2	2381
	α Aquilæ	E.	84 29 55	2738	82 54 5	2753	81 18 35	2769	79 43 26	2787
	Sun	E.	131 33 45	2450	129 51 21	2460	128 9 12	2470	126 27 17	2489
12	Pollux	W.	122 39 20	2249	124 26 34	2264	126 13 27	2279	127 59 58	2294
	Regulus	W.	85 49 9	2224	87 37 1	2237	89 24 34	2249	91 11 48	2263
	Spica	W.	31 49 1	2240	33 36 29	2251	35 23 41	2262	37 10 37	2273
	Mars	E.	61 57 47	2443	60 15 14	2457	58 33 0	2470	56 51 5	2484
	α Aquilæ	E.	71 54 16	2901	70 21 59	2929	68 50 17	2959	67 19 13	2991
	Jupiter	E.	93 9 5	2295	91 22 58	2307	89 37 9	2330	87 51 38	2353
	Sun	E.	118 1 49	2543	116 21 36	2556	114 41 41	2570	113 2 5	2583
13	Regulus	W.	100 3 4	2330	101 48 20	2344	103 33 16	2357	105 17 52	2372
	Spica	W.	46 0 49	2336	47 45 56	2349	49 30 44	2363	51 15 12	2376
	Mars	E.	48 26 24	2555	46 46 27	2569	45 6 50	2584	43 27 33	2599
	α Aquilæ	E.	59 54 42	3185	58 28 15	3202	57 2 44	3229	55 38 11	3256
	Jupiter	E.	79 8 57	2401	77 25 24	2416	75 42 12	2430	73 59 20	2444
	Sun	E.	104 48 51	2655	103 11 11	2670	101 33 51	2685	99 56 51	2699
14	Regulus	W.	113 55 50	2441	115 38 26	2455	117 20 43	2469	119 2 40	2483
	Spica	W.	59 52 46	2443	61 35 19	2457	63 17 33	2470	64 59 28	2484
	Mars	E.	35 16 10	2679	33 38 53	2687	32 1 55	2701	30 25 17	2716
	α Aquilæ	E.	48 52 19	3670	47 35 0	3754	46 19 10	3846	45 4 55	3945
	Jupiter	E.	65 30 0	2515	63 49 8	2529	62 8 35	2543	60 28 22	2557
	Sun	E.	91 56 46	2774	90 21 44	2789	88 47 2	2804	87 12 39	2818
15	Spica	W.	73 24 24	2549	75 4 29	2569	76 44 16	2574	78 23 46	2587
	Antares	W.	27 35 18	2543	29 15 31	2556	30 55 26	2569	32 35 4	2581
	Mars	E.	22 26 50	2786	20 52 4	2801	19 17 37	2815	17 43 28	2828
	Jupiter	E.	52 12 4	2826	50 33 44	2840	48 55 43	2854	47 18 1	2867
	Sun	E.	79 25 29	2891	77 52 59	2905	76 20 46	2919	74 48 51	2932
16	Spica	W.	86 37 3	2648	88 14 53	2659	89 52 28	2670	91 29 48	2681
	Antares	W.	40 49 1	2642	42 26 59	2653	44 4 42	2664	45 42 10	2676
	Jupiter	E.	39 13 55	2732	37 37 58	2745	36 2 18	2758	34 26 55	2771
	Sun	E.	67 13 34	3000	65 43 21	3013	64 13 24	3026	62 43 43	3038
17	Spica	W.	99 32 46	2735	101 8 40	2745	102 44 20	2756	104 19 46	2768
	Antares	W.	53 45 46	2729	55 21 48	2739	56 57 36	2750	58 33 10	2760
	Jupiter	E.	26 34 17	2938	25 0 38	2959	23 27 17	2967	21 54 16	2983
	Sun	E.	55 19 6	3099	53 50 55	3110	52 22 58	3122	50 55 15	3133
18	Spica	W.	112 13 48	2812	113 48 0	2821	115 22 1	2830	116 55 50	2838
	Antares	W.	66 27 54	2806	68 2 14	2815	69 36 23	2822	71 10 22	2831
	Sun	E.	43 40 6	3189	42 13 44	3201	40 47 36	3212	39 21 41	3223
19	Antares	W.	78 57 35	2871	80 30 31	2879	82 3 17	2886	83 35 54	2893



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dif.	IIIh.	P. L. of Dif.	VIh.	P. L. of Dif.	IXh.	P. L. of Dif.
19	Mars W. Sun E.	20 10 53 37 55 59	3101 3234	21 39 2 36 30 30	3110 3246	23 7 0 35 5 15	3119 3257	24 34 47 33 40 13	3127 3269
20	Antares W. α Aquilæ W. Mars W. Sun E.	85 8 22 41 7 47 31 51 19 26 38 35	2901 4615 3166 3332	86 40 40 42 9 59 33 18 9 25 15 1	2908 4522 3173 3347	88 12 49 43 13 32 34 44 51 23 51 44	2914 4437 3180 3364	89 44 50 44 18 20 36 11 24 22 28 46	2920 4360 3187 3382
24	Sun W. Aldebaran E. Pollux E.	18 26 31 47 54 40 89 42 2	3565 3178 3085	19 45 44 46 28 4 88 13 34	3553 3186 3088	21 5 10 45 1 38 86 45 10	3543 3194 3091	22 24 47 43 35 22 85 16 49	3534 3204 3092
25	Sun W. Aldebaran E. Pollux E. Regulus E.	29 4 34 36 27 1 77 55 40 114 51 23	3512 3260 3101 3084	30 24 45 35 2 3 76 27 32 113 22 54	3509 3276 3103 3085	31 44 59 33 37 23 74 59 26 111 54 26	3506 3292 3104 3086	33 5 16 32 13 2 73 31 21 110 25 59	3504 3310 3105 3088
26	Sun W. Pollux E. Regulus E.	39 47 26 66 11 5 103 3 42	3490 3105 3083	41 8 1 64 43 1 101 35 12	3487 3104 3082	42 28 40 63 14 56 100 6 41	3484 3103 3080	43 49 22 61 46 50 98 38 7	3480 3102 3078
27	Sun W. Venus W. α Arietis W. Pollux E. Regulus E.	50 34 0 24 18 29 21 24 59 54 25 53 91 14 31	3458 3637 3174 3092 3063	51 55 11 25 36 23 22 51 39 52 57 34 89 45 36	3454 3623 3156 3089 3059	53 16 27 26 54 32 24 18 41 51 29 11 88 16 36	3448 3610 3140 3087 3054	54 37 49 28 12 56 25 46 2 50 0 45 86 47 30	3449 3597 3136 3083 3049
28	Sun W. Venus W. α Arietis W. Pollux E. Regulus E.	61 26 30 34 48 15 33 6 42 42 37 30 79 20 23	3407 3538 3067 3065 3019	62 48 39 36 7 57 34 35 32 41 8 37 77 50 34	3398 3526 3056 3061 3013	64 10 58 37 27 52 36 4 36 39 39 40 76 20 37	3389 3515 3044 3056 3005	65 33 27 38 48 0 37 33 54 38 10 37 74 50 30	3381 3503 3034 3052 2997
29	Sun W. Venus W. α Arietis W. Pollux E. Regulus E. Spica E.	72 28 33 45 32 1 45 3 49 30 44 11 67 17 18 121 20 30	3339 3440 2977 3036 2951 2954	73 52 11 46 53 32 46 34 31 29 14 43 65 46 4 119 49 19	3318 3427 2965 3034 2941 2949	75 16 2 48 15 18 48 5 28 27 45 13 64 14 37 118 17 54	3306 3414 2952 3034 2931 2931	76 40 7 49 37 19 49 36 41 26 15 43 62 42 57 116 46 15	3294 3400 2940 3035 2919 2920
30	Sun W. α Arietis W. Venus W. Aldebaran W. Regulus E. Spica E.	83 44 20 57 16 50 56 31 30 26 14 1 55 0 52 109 4 10	3295 2873 3325 3160 2958 2957	85 10 0 58 49 44 57 55 13 27 40 58 53 27 39 107 30 56	3299 2958 3309 3117 2945 2943	86 35 58 60 22 57 59 19 14 29 8 47 51 54 9 105 57 24	3194 2944 3299 3077 2931 2929	88 2 14 61 56 28 60 43 35 30 37 25 50 20 21 104 23 34	3179 2926 3276 3039 2917 2914
31	Sun W. α Arietis W. Venus W. Aldebaran W. Regulus E. Spica E.	95 18 23 69 49 7 67 50 21 38 11 7 42 26 39 96 29 27	3085 2749 3167 2987 2742 2737	96 46 39 71 24 42 69 16 46 39 43 43 40 50 55 94 53 36	3078 2732 3168 2980 2736 2720	98 15 16 73 0 40 70 43 34 41 16 53 39 14 50 93 17 23	3080 2715 3149 2934 2710 2703	99 44 15 74 37 0 72 10 44 42 50 37 37 38 24 91 40 47	3041 2928 3129 2909 2925 2927



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to		Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.	subtracted from Apparent Time.				
Tues.	1	<sup>h</sup> 0 <sup>m</sup> 41 <sup>s</sup> 54.87	9.096	N. 4° 30' 43.2"	+57.85	16' 2.16"	<sup>s</sup> 64.51	<sup>m</sup> 4 <sup>s</sup> 0.60	<sup>s</sup> 0.758		
Wed.	2	0 45 33.24	9.100	4 53 49.1	57.64	16 1.89	64.53	3 42.46	0.754		
Thur.	3	0 49 11.70	9.106	5 16 49.8	57.41	16 1.61	64.55	3 24.43	0.748		
Frid.	4	0 52 50.31	9.112	5 39 44.9	57.17	16 1.34	64.57	3 6.53	0.742		
Sat.	5	0 56 29.07	9.119	6 2 33.9	56.93	16 1.07	64.59	2 48.79	0.735		
Sun.	6	1 0 8.01	9.127	6 25 16.5	56.64	16 0.80	64.62	2 31.23	0.728		
Mon.	7	1 3 47.15	9.135	6 47 52.7	56.36	16 0.52	64.65	2 13.85	0.718		
Tues.	8	1 7 26.50	9.144	7 10 22.0	56.07	16 0.25	64.69	1 56.71	0.709		
Wed.	9	1 11 6.11	9.155	7 32 44.2	55.76	15 59.97	64.73	1 39.81	0.698		
Thur.	10	1 14 45.98	9.166	7 54 58.8	55.44	15 59.69	64.76	1 23.17	0.687		
Frid.	11	1 18 26.12	9.178	8 17 5.7	55.11	15 59.41	64.80	1 6.81	0.675		
Sat.	12	1 22 6.57	9.191	8 39 4.2	54.76	15 59.14	64.85	0 50.76	0.663		
Sun.	13	1 25 47.34	9.205	9 0 54.1	54.40	15 58.86	64.89	0 35.02	0.649		
Mon.	14	1 29 28.45	9.219	9 22 35.4	54.03	15 58.59	64.94	0 19.60	0.635		
Tues.	15	1 33 9.91	9.234	9 44 7.5	53.64	15 58.31	64.99	0 4.54	0.620		
Wed.	16	1 36 51.74	9.250	10 5 29.9	53.23	15 58.04	65.04	0 10.15	0.604		
Thur.	17	1 40 33.95	9.268	10 26 42.3	52.80	15 57.77	65.09	0 24.46	0.587		
Frid.	18	1 44 16.56	9.285	10 47 44.7	52.37	15 57.50	65.15	0 38.36	0.570		
Sat.	19	1 47 59.58	9.302	11 8 36.4	51.92	15 57.24	65.21	0 51.85	0.553		
Sun.	20	1 51 43.01	9.320	11 29 17.1	51.45	15 56.98	65.27	1 4.93	0.536		
Mon.	21	1 55 26.87	9.337	11 49 46.4	50.97	15 56.72	65.33	1 17.60	0.518		
Tues.	22	1 59 11.17	9.355	12 10 4.1	50.47	15 56.46	65.40	1 29.82	0.500		
Wed.	23	2 2 55.91	9.374	12 30 9.7	49.96	15 56.20	65.46	1 41.60	0.481		
Thur.	24	2 6 41.11	9.393	12 50 3.0	49.45	15 55.95	65.53	1 52.92	0.463		
Frid.	25	2 10 26.77	9.413	13 9 43.7	48.91	15 55.70	65.60	2 3.78	0.442		
Sat.	26	2 14 12.91	9.433	13 29 11.2	48.36	15 55.46	65.67	2 14.17	0.422		
Sun.	27	2 17 59.54	9.452	13 48 25.3	47.81	15 55.22	65.74	2 24.07	0.402		
Mon.	28	2 21 46.64	9.472	14 7 25.8	47.23	15 54.98	65.82	2 33.49	0.382		
Tues.	29	2 25 34.23	9.493	14 26 12.2	46.65	15 54.74	65.90	2 42.43	0.361		
Wed.	30	2 29 22.33	9.514	14 44 44.4	46.04	15 54.51	65.98	2 50.87	0.340		
Thur.	31	2 33 10.94	9.536	N.15 3 2.2	+45.42	15 54.28	65.06	2 58.79	0.318		

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.

+ prefixed to the hourly change of declination indicates that north declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from		Sideral Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	added to Mean Time.	Diff. for 1 hour.	
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	N. <sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Tues.	1	0 41 54.27	9.098	N. 4 30 39.4	+57.86	4 0.65	0.753	0 37 53.62
Wed.	2	0 45 32.68	9.102	4 53 45.6	57.65	3 42.50	0.754	0 41 50.16
Thur.	3	0 49 11.19	9.108	5 16 46.6	57.42	3 24.47	0.748	0 45 46.72
Frid.	4	0 52 49.84	9.114	5 39 42.0	57.18	3 6.57	0.742	0 49 43.27
Sat.	5	0 56 28.65	9.121	6 2 31.3	56.92	2 48.82	0.735	0 53 39.83
Sun.	6	1 0 7.64	9.129	6 25 14.2	56.65	2 31.26	0.728	0 57 36.38
Mon.	7	1 3 46.82	9.137	6 47 50.7	56.37	2 13.88	0.718	1 1 32.94
Tues.	8	1 7 26.22	9.146	7 10 20.3	56.08	1 56.74	0.709	1 5 29.48
Wed.	9	1 11 5.87	9.157	7 32 42.8	55.77	1 39.83	0.698	1 9 26.04
Thur.	10	1 14 45.78	9.168	7 54 57.6	55.45	1 23.19	0.687	1 13 22.59
Frid.	11	1 18 25.96	9.180	8 17 4.7	55.12	1 6.81	0.675	1 17 19.15
Sat.	12	1 22 6.44	9.193	8 39 3.5	54.77	0 50.77	0.662	1 21 15.67
Sun.	13	1 25 47.26	9.207	9 0 53.7	54.41	0 35.03	0.649	1 25 12.23
Mon.	14	1 29 28.41	9.221	9 22 35.2	54.04	0 19.60	0.635	1 29 8.81
Tues.	15	1 33 9.91	9.236	9 44 7.4	53.65	0 4.54	0.620	1 33 5.37
Wed.	16	1 36 51.77	9.252	10 5 30.1	53.24	0 10.15	0.604	1 37 1.92
Thur.	17	1 40 34.02	9.269	10 26 42.8	52.81	0 24.46	0.587	1 40 58.48
Frid.	18	1 44 16.67	9.286	10 47 45.3	52.38	0 38.36	0.570	1 44 55.03
Sat.	19	1 47 59.73	9.303	11 8 37.2	51.93	0 51.86	0.553	1 48 51.59
Sun.	20	1 51 43.19	9.321	11 29 18.1	51.46	1 4.94	0.536	1 52 48.13
Mon.	21	1 55 27.08	9.338	11 49 47.6	50.98	1 17.61	0.518	1 56 44.69
Tues.	22	1 59 11.41	9.356	12 10 5.4	50.48	1 29.83	0.500	2 0 41.24
Wed.	23	2 2 56.19	9.375	12 30 11.2	49.97	1 41.61	0.481	2 4 37.80
Thur.	24	2 6 41.42	9.394	12 50 4.7	49.46	1 52.93	0.462	2 8 34.35
Frid.	25	2 10 27.11	9.414	13 9 45.4	48.92	2 3.80	0.442	2 12 30.91
Sat.	26	2 14 13.28	9.434	13 29 13.1	48.37	2 14 18	0.422	2 16 27.46
Sun.	27	2 17 59.93	9.453	13 48 27.3	47.81	2 24.09	0.402	2 20 24.02
Mon.	28	2 21 47.06	9.473	14 7 17.9	47.23	2 33.51	0.382	2 24 20.57
Tues.	29	2 25 34.67	9.494	14 26 14.5	46.65	2 42.46	0.361	2 28 17.13
Wed.	30	2 29 22.79	9.515	14 44 46.7	46.04	2 50.89	0.340	2 32 13.68
Thur.	31	2 33 11.42	9.537	N.15 3 4.5	+45.42	2 58.82	0.318	2 36 10.24

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

+ prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 hour.

+ 9°.8565

(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal 0 <sup>h</sup> .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	91	11 <sup>o</sup> 24' 6.4"	23 39.6	147.84	−0.22	9.9999258	+51.1	23 18 16.69	
2	92	12 23 13.6	22 46.7	147.75	0.35	0.0000486	51.3	23 14 20.78	
3	93	13 22 18.5	21 51.5	147.66	0.46	.0001718	51.3	23 10 24.87	
4	94	14 21 21.1	20 54.0	147.57	0.55	.0002954	51.4	23 6 28.96	
5	95	15 20 21.6	19 54.4	147.49	0.64	.0004193	51.6	23 2 33.05	
6	96	16 19 20.2	18 52.9	147.40	0.69	.0005434	51.8	22 58 37.14	
7	97	17 18 16.8	17 49.4	147.31	0.71	.0006679	52.0	22 54 41.23	
8	98	18 17 11.2	16 43.7	147.23	0.70	.0007929	52.1	22 50 45.32	
9	99	19 16 3.5	15 35.9	147.15	0.65	.0009181	52.2	22 46 49.42	
10	100	20 14 53.8	14 26.0	147.07	0.59	.0010435	52.3	22 42 53.51	
11	101	21 13 43.0	13 15.1	147.00	0.50	.0011690	52.2	22 38 57.60	
12	102	22 12 30.2	12 2.2	146.93	0.38	.0012943	52.1	22 35 1.69	
13	103	23 11 15.5	10 47.4	146.86	0.25	.0014193	51.9	22 31 5.79	
14	104	24 9 59.1	9 30.9	146.78	−0.11	.0015439	51.8	22 27 9.88	
15	105	25 8 41.0	8 12.7	146.71	+0.03	.0016679	51.5	22 23 13.97	
16	106	26 7 21.3	6 52.8	146.64	0.17	.0017912	51.2	22 19 18.06	
17	107	27 5 59.8	5 31.3	146.57	0.28	.0019137	50.8	22 15 22.16	
18	108	28 4 36.7	4 8.0	146.50	0.37	.0020352	50.4	22 11 26.25	
19	109	29 3 11.7	2 42.9	146.43	0.46	.0021555	49.9	22 7 30.34	
20	110	30 1 45.0	1 16.0	146.35	0.52	.0022746	49.3	22 3 34.43	
21	111	30 60 16.5	59 47.4	146.27	0.52	.0023923	48.8	21 59 38.53	
22	112	31 58 46.1	58 16.9	146.19	0.52	.0025087	48.3	21 55 42.62	
23	113	32 57 13.7	56 44.4	146.11	0.48	.0026237	47.7	21 51 46.71	
24	114	33 55 39.3	55 9.9	146.02	0.42	.0027373	47.1	21 47 50.80	
25	115	34 54 2.8	53 33.3	145.94	0.32	.0028497	46.6	21 43 54.89	
26	116	35 52 24.4	51 54.7	145.85	0.22	.0029607	46.0	21 39 58.98	
27	117	36 50 43.9	50 14.1	145.77	+0.10	.0030705	45.5	21 36 3.07	
28	118	37 49 1.3	48 31.4	145.68	−0.03	.0031792	45.0	21 32 7.16	
29	119	38 47 16.6	46 46.5	145.60	0.17	.0032868	44.6	21 28 11.26	
30	120	39 45 29.9	44 59.6	145.51	0.28	.0033935	44.2	21 24 15.35	
31	121	40 43 41.2	43 10.8	145.43	−0.37	0.0034993	+43.9	21 20 19.44	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>h</sup> .0.									Diff. for 1 hour. −9 <sup>m</sup> .8396 (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.	
1	15 37.6	15 45.4	57 14.3	+2.32	57 42.7	+2.40	h m 7 41.4	m 2.15	d 9.6	
2	15 53.3	16 1.3	58 11.9	2.44	58 41.3	2.43	8 32.4	2.11	10.6	
3	16 9.2	16 16.7	59 10.2	2.36	59 37.9	2.23	9 22.8	2.09	11.6	
4	16 23.8	16 30.1	60 3.8	2.04	60 27.0	1.80	10 13.2	2.11	12.6	
5	16 35.6	16 39.9	60 47.0	1.50	61 3.0	1.15	11 4.6	2.18	13.6	
6	16 43.0	16 44.8	61 14.6	+0.76	61 21.3	+0.35	11 58.2	2.30	14.6	
7	16 45.3	16 44.5	61 23.0	-0.06	61 19.8	-0.47	12 54.9	2.43	15.6	
8	16 42.2	16 38.9	61 11.7	0.86	60 59.1	1.22	13 54.8	2.56	16.6	
9	16 34.3	16 28.8	60 42.4	1.53	60 22.3	1.78	14 57.2	2.62	17.6	
10	16 22.6	16 15.8	59 59.4	1.99	59 34.5	2.13	16 0.0	2.59	18.6	
11	16 8.7	16 1.3	59 8.2	2.23	58 41.1	2.27	17 0.8	2.46	19.6	
12	15 53.8	15 46.5	58 13.8	2.26	57 46.9	2.21	17 57.7	2.27	20.6	
13	15 39.4	15 32.6	57 20.7	2.13	56 55.7	2.03	18 49.9	2.08	21.6	
14	15 26.1	15 20.1	56 32.0	1.91	56 9.8	1.79	19 37.7	1.90	22.6	
15	15 14.4	15 9.3	55 49.2	1.64	55 30.5	1.49	20 22.0	1.78	23.6	
16	15 4.7	15 0.6	55 13.6	1.34	54 58.5	1.19	21 3.8	1.71	24.6	
17	14 57.0	14 53.8	54 45.1	1.04	54 33.5	0.90	21 44.3	1.67	25.6	
18	14 51.1	14 48.9	54 23.5	0.76	54 15.2	0.63	22 24.6	1.68	26.6	
19	14 47.0	14 45.6	54 8.4	0.50	54 3.1	0.38	23 5.4	1.73	27.6	
20	14 44.5	14 43.7	53 59.1	0.27	53 56.5	-0.16	23 47.7	1.81	28.6	
21	14 43.4	14 43.4	53 55.3	-0.06	53 55.3	+0.06	6		29.6	
22	14 43.8	14 44.6	53 56.7	+0.17	53 59.4	0.29	0 32.2	1.90	0.9	
23	14 45.7	14 47.2	54 3.6	0.41	54 9.3	0.54	1 19.0	2.01	1.9	
24	14 49.2	14 51.6	54 16.5	0.67	54 25.3	0.80	2 8.2	2.10	2.9	
25	14 54.5	14 57.8	54 35.8	0.94	54 48.0	1.09	2 59.3	2.15	3.9	
26	15 1.6	15 5.9	55 2.1	1.24	55 17.9	1.39	3 51.2	2.16	4.9	
27	15 10.7	15 16.1	55 35.5	1.54	55 55.0	1.69	4 43.1	2.14	5.9	
28	15 21.8	15 28.1	56 16.3	1.84	56 39.3	1.98	5 34.0	2.10	6.9	
29	15 34.8	15 41.8	57 3.9	2.10	57 29.7	2.19	6 23.8	2.05	7.9	
30	15 49.1	15 56.6	57 56.5	2.26	58 24.0	2.30	7 12.5	2.02	8.9	
31	16 4.2	16 11.5	58 51.7	2.29	59 18.9	2.23	8 1.0	2.03	9.9	
32	16 16.7	16 25.3	59 45.1	+2.11	60 9.5	+1.93	8 50.3	2.09	10.9	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 1.					THURSDAY 3.				
0	h m s		N. 20 40 30.7	9.543	0	h m s		N. 10 55 30.9	14.479
1	8 3 17.47	2.2485	20 30 54.4	9.666	1	9 49 33.83	2.1884	10 40 59.8	14.557
2	8 5 32.33	2.2469	20 21 10.8	9.787	2	9 51 45.12	2.1880	10 26 24.0	14.634
3	8 7 47.10	2.2454	20 11 20.0	9.907	3	9 53 56.39	2.1877	10 11 43.7	14.709
4	8 10 1.78	2.2428	20 1 22.0	10.028	4	9 56 7.64	2.1873	9 56 58.9	14.783
5	8 12 16.36	2.2422	19 51 16.7	10.148	5	9 58 18.87	2.1870	9 42 9.7	14.856
6	8 14 30.84	2.2406	19 41 4.2	10.267	6	10 0 30.08	2.1867	9 27 16.2	14.928
7	8 16 45.23	2.2391	19 30 44.6	10.385	7	10 2 41.28	2.1866	9 12 18.4	14.998
8	8 18 59.53	2.2375	19 20 18.0	10.502	8	10 4 52.47	2.1865	8 57 16.4	15.066
9	8 21 13.73	2.2358	19 9 44.4	10.618	9	10 7 3.66	2.1864	8 42 10.4	15.133
10	8 23 27.83	2.2342	18 59 3.8	10.734	10	10 9 14.84	2.1863	8 27 0.4	15.200
11	8 25 41.84	2.2327	18 48 16.3	10.850	11	10 11 26.02	2.1864	8 11 46.4	15.266
12	8 27 55.75	2.2311	18 37 21.8	10.965	12	10 13 37.21	2.1866	7 56 28.5	15.330
13	8 30 9.57	2.2295	18 26 20.5	11.078	13	10 15 48.41	2.1867	7 41 6.8	15.392
14	8 32 23.29	2.2279	18 15 12.4	11.191	14	10 17 59.62	2.1869	7 25 41.5	15.452
15	8 34 36.92	2.2264	18 3 57.6	11.303	15	10 20 10.84	2.1872	7 10 12.6	15.511
16	8 36 50.46	2.2248	17 52 36.1	11.414	16	10 22 22.08	2.1876	6 54 40.2	15.569
17	8 39 3.90	2.2233	17 41 7.9	11.526	17	10 24 33.35	2.1880	6 39 4.3	15.626
18	8 41 17.26	2.2219	17 29 33.0	11.636	18	10 26 44.64	2.1884	6 23 25.1	15.681
19	8 43 30.53	2.2204	17 17 51.6	11.744	19	10 28 55.96	2.1890	6 7 42.6	15.734
20	8 45 43.71	2.2189	17 6 3.7	11.852	20	10 31 7.32	2.1896	5 51 57.0	15.786
21	8 47 56.80	2.2174	16 54 9.4	11.959	21	10 33 18.71	2.1902	5 36 8.3	15.837
22	8 50 9.80	2.2159	16 42 8.6	12.066	22	10 35 30.14	2.1909	5 20 16.6	15.886
23	8 52 22.71	2.2145	N. 16 30 1.5	12.171	23	10 37 41.62	2.1917	N. 5 4 22.0	15.934
24	8 54 35.54	2.2131				10 39 53.14	2.1925		
WEDNESDAY 2.					FRIDAY 4.				
0	h m s		N. 16 17 48.1	12.276	0	h m s		N. 4 48 24.5	15.981
1	8 56 48.29	2.2117	16 5 28.4	12.379	1	10 42 4.72	2.1935	4 32 24.3	16.025
2	8 59 0.95	2.2103	15 53 2.6	12.481	2	10 44 16.36	2.1945	4 16 21.5	16.067
3	9 1 13.53	2.2091	15 40 30.7	12.583	3	10 46 28.06	2.1955	4 0 16.2	16.108
4	9 3 26.04	2.2078	15 27 52.7	12.684	4	10 48 39.82	2.1966	3 44 8.5	16.148
5	9 5 38.47	2.2065	15 15 8.6	12.784	5	10 50 51.65	2.1978	3 27 58.4	16.187
6	9 7 50.82	2.2052	15 2 18.6	12.889	6	10 53 3.56	2.1991	3 11 46.1	16.223
7	9 10 3.10	2.2040	14 49 22.7	12.980	7	10 55 15.54	2.2004	2 55 31.6	16.258
8	9 12 15.30	2.2028	14 36 21.0	13.077	8	10 57 27.61	2.2018	2 39 15.1	16.291
9	9 14 27.43	2.2017	14 23 13.5	13.173	9	10 59 39.76	2.2033	2 22 56.7	16.323
10	9 16 39.50	2.2006	14 10 0.3	13.268	10	11 1 52.00	2.2048	2 6 36.4	16.353
11	9 18 51.50	2.1995	13 56 41.4	13.362	11	11 4 4.34	2.2064	1 50 14.3	16.389
12	9 21 3.44	2.1984	13 43 16.9	13.454	12	11 6 16.77	2.2080	1 33 50.6	16.408
13	9 23 15.31	2.1973	13 29 46.9	13.546	13	11 8 29.30	2.2097	1 17 25.3	16.433
14	9 25 27.12	2.1964	13 16 11.4	13.636	14	11 10 41.94	2.2116	1 0 58.6	16.456
15	9 27 38.88	2.1955	13 2 30.6	13.725	15	11 12 54.69	2.2135	0 44 30.6	16.477
16	9 29 50.58	2.1946	12 48 44.4	13.814	16	11 15 7.56	2.2155	0 28 1.4	16.497
17	9 32 2.23	2.1937	12 34 52.9	13.902	17	11 17 20.55	2.2175	N. 0 11 31.0	16.515
18	9 34 13.83	2.1929	12 20 56.2	13.987	18	11 19 33.66	2.2195	S. 0 5 0.4	16.531
19	9 36 25.38	2.1922	12 6 54.4	14.072	19	11 21 46.89	2.2217	0 21 32.7	16.545
20	9 38 36.89	2.1914	11 52 47.6	14.156	20	11 24 0.26	2.2239	0 38 5.8	16.557
21	9 40 48.35	2.1907	11 38 35.7	14.239	21	11 26 13.76	2.2262	0 54 39.6	16.568
22	9 42 59.77	2.1901	11 24 18.9	14.320	22	11 28 27.40	2.2286	1 11 14.0	16.577
23	9 45 11.16	2.1895	11 9 57.3	14.400	23	11 30 41.19	2.2311	1 27 48.9	16.584
24	9 47 22.51	2.1889	N. 10 55 30.9	14.479	24	11 32 55.13	2.2336	S. 1 44 24.1	16.589
	9 49 33.83	2.1884				11 35 9.22	2.2362		

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 5.					MONDAY 7.				
0	11 35 9.22	2.2362	S. 1° 44' 24.1"	16.589	0	13 26 42.31	2.4399	S. 14° 28' 47.9"	14.461
1	11 37 23.47	2.2368	2 0 59.6	16.592	1	13 29 8.44	2.4381	14 43 12.7	14.365
2	11 39 37.88	2.2415	2 17 35.2	16.593	2	13 31 34.88	2.4432	14 57 31.7	14.267
3	11 41 52.45	2.2443	2 34 10.8	16.592	3	13 34 1.63	2.4484	15 11 44.8	14.167
4	11 44 7.19	2.2472	2 50 46.3	16.591	4	13 36 28.69	2.4537	15 25 51.8	14.065
5	11 46 22.11	2.2509	3 7 21.7	16.587	5	13 38 56.07	2.4589	15 39 52.6	13.960
6	11 48 37.21	2.2539	3 23 56.8	16.581	6	13 41 23.76	2.4641	15 53 47.0	13.853
7	11 50 52.49	2.2562	3 40 31.4	16.572	7	13 43 51.76	2.4693	16 7 35.0	13.745
8	11 53 7.96	2.2583	3 57 5.4	16.562	8	13 46 20.08	2.4746	16 21 16.4	13.634
9	11 55 23.61	2.2605	4 13 38.8	16.550	9	13 48 48.71	2.4798	16 34 51.1	13.529
10	11 57 39.46	2.2658	4 30 11.4	16.536	10	13 51 17.66	2.4851	16 48 19.0	13.407
11	11 59 55.51	2.2692	4 46 43.1	16.520	11	13 53 46.92	2.4902	17 1 40.0	13.291
12	12 2 11.77	2.2737	5 3 13.8	16.502	12	13 56 16.49	2.4954	17 14 53.9	13.172
13	12 4 28.24	2.2762	5 19 43.3	16.482	13	13 58 46.37	2.5007	17 28 0.6	13.051
14	12 6 44.91	2.2796	5 36 11.6	16.460	14	14 1 16.57	2.5059	17 41 0.0	12.928
15	12 9 1.79	2.2839	5 52 38.5	16.435	15	14 3 47.08	2.5111	17 53 52.0	12.803
16	12 11 18.89	2.2869	6 9 3.8	16.408	16	14 6 17.90	2.5162	18 6 36.4	12.677
17	12 13 36.22	2.2907	6 25 27.5	16.381	17	14 8 49.03	2.5213	18 19 13.2	12.549
18	12 15 53.77	2.2944	6 41 49.5	16.351	18	14 11 20.46	2.5264	18 31 42.3	12.419
19	12 18 11.55	2.2983	6 58 9.6	16.318	19	14 13 52.20	2.5315	18 44 3.5	12.291
20	12 20 29.57	2.3023	7 14 27.7	16.283	20	14 16 24.24	2.5365	18 56 16.7	12.159
21	12 22 47.83	2.3063	7 30 43.6	16.247	21	14 18 56.58	2.5415	19 8 21.7	12.015
22	12 25 6.33	2.3103	7 46 57.3	16.208	22	14 21 29.22	2.5465	19 20 18.5	11.877
23	12 27 25.07	2.3144	S. 8 3 8.6	16.168	23	14 24 2.16	2.5515	S. 19 32 7.0	11.738
SUNDAY 6.					TUESDAY 8.				
0	12 29 44.06	2.3186	S. 8 19 17.5	16.126	0	14 26 35.40	2.5564	S. 19 43 47.1	11.597
1	12 32 3.30	2.3228	8 35 23.7	16.080	1	14 29 8.93	2.5612	19 55 18.6	11.453
2	12 34 22.80	2.3272	8 51 27.1	16.033	2	14 31 42.74	2.5659	20 6 41.5	11.308
3	12 36 42.56	2.3315	9 7 27.7	15.985	3	14 34 16.84	2.5707	20 17 55.6	11.163
4	12 39 2.58	2.3358	9 23 25.3	15.933	4	14 36 51.22	2.5753	20 29 0.9	11.013
5	12 41 22.86	2.3402	9 39 19.7	15.880	5	14 39 25.88	2.5800	20 39 57.2	10.863
6	12 43 43.41	2.3447	9 55 10.9	15.825	6	14 42 0.82	2.5846	20 50 44.5	10.713
7	12 46 4.23	2.3493	10 10 58.7	15.767	7	14 44 36.03	2.5890	21 1 22.6	10.558
8	12 48 25.33	2.3540	10 26 42.9	15.707	8	14 47 11.50	2.5933	21 11 51.5	10.403
9	12 50 46.71	2.3587	10 42 23.5	15.646	9	14 49 47.23	2.5977	21 22 11.0	10.247
10	12 53 8.37	2.3633	10 58 0.4	15.582	10	14 52 23.22	2.6020	21 32 21.1	10.089
11	12 55 30.31	2.3680	11 13 33.3	15.515	11	14 54 59.47	2.6062	21 42 21.7	9.929
12	12 57 52.53	2.3728	11 29 2.2	15.447	12	14 57 35.96	2.6102	21 52 12.6	9.768
13	13 0 15.04	2.3776	11 44 27.0	15.377	13	15 0 12.69	2.6142	22 1 53.8	9.606
14	13 2 37.84	2.3825	11 59 47.5	15.304	14	15 2 49.67	2.6182	22 11 25.3	9.442
15	13 5 0.94	2.3874	12 15 3.5	15.229	15	15 5 26.88	2.6220	22 20 46.9	9.277
16	13 7 24.33	2.3923	12 30 15.0	15.152	16	15 8 4.31	2.6257	22 29 58.6	9.111
17	13 9 48.02	2.3973	12 45 21.8	15.073	17	15 10 41.96	2.6293	22 39 0.2	8.943
18	13 12 12.01	2.4023	13 0 23.8	14.992	18	15 13 19.83	2.6329	22 47 51.7	8.773
19	13 14 36.30	2.4073	13 15 20.9	14.909	19	15 15 57.91	2.6363	22 56 33.0	8.603
20	13 17 0.89	2.4123	13 30 12.9	14.824	20	15 18 36.19	2.6396	23 5 4.1	8.432
21	13 19 25.78	2.4174	13 44 59.8	14.737	21	15 21 14.66	2.6428	23 13 24.9	8.260
22	13 21 50.98	2.4226	13 59 41.3	14.647	22	15 23 53.32	2.6459	23 21 35.3	8.086
23	13 24 16.49	2.4277	14 14 17.4	14.555	23	15 26 32.17	2.6489	23 29 35.2	7.911
24	13 26 42.31	2.4329	S. 14 28 47.9	14.461	24	15 29 11.19	2.6517	S. 23 37 24.6	7.735



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 9.					FRIDAY 11.				
0	15 <sup>h</sup> 29 <sup>m</sup> 11.19	2.8517	S. 23° 37' 24.6"	7.735	0	17 <sup>h</sup> 37 <sup>m</sup> 4.04	2.6188	S. 26° 16' 10.6"	1.180
1	15 31 50.38	2.8545	23 45 3.4	7.558	1	17 39 41.00	2.6138	26 14 58.1	1.907
2	15 34 29.73	2.8571	23 52 31.6	7.380	2	17 42 17.69	2.6083	26 13 35.0	1.478
3	15 37 9.23	2.8596	23 59 49.0	7.901	3	17 44 54.11	2.6047	26 12 1.5	1.646
4	15 39 48.88	2.8620	24 6 55.7	7.022	4	17 47 30.25	2.5999	26 10 17.5	1.890
5	15 42 28.67	2.8642	24 13 51.6	6.842	5	17 50 6.10	2.5950	26 8 23.1	1.992
6	15 45 8.58	2.8662	24 20 36.7	6.661	6	17 52 41.65	2.5900	26 6 18.5	2.163
7	15 47 48.62	2.8682	24 27 10.9	6.478	7	17 55 16.90	2.5849	26 4 3.6	2.333
8	15 50 28.77	2.8701	24 33 34.1	6.295	8	17 57 51.84	2.5797	26 1 38.5	2.503
9	15 53 9.03	2.8718	24 39 46.3	6.112	9	18 0 26.46	2.5743	25 59 3.3	2.671
10	15 55 49.38	2.8733	24 45 47.5	5.928	10	18 3 0.76	2.5689	25 56 18.0	2.837
11	15 58 29.82	2.8747	24 51 37.6	5.743	11	18 5 34.73	2.5634	25 53 22.8	3.008
12	16 1 10.34	2.8759	24 57 16.6	5.558	12	18 8 8.37	2.5577	25 50 17.7	3.167
13	16 3 50.93	2.8770	25 2 44.5	5.379	13	18 10 41.66	2.5519	25 47 2.7	3.331
14	16 6 31.58	2.8780	25 8 1.2	5.185	14	18 13 14.60	2.5461	25 43 38.0	3.493
15	16 9 12.29	2.8788	25 13 6.7	4.990	15	18 15 47.19	2.5402	25 40 3.6	3.653
16	16 11 53.04	2.8795	25 18 1.1	4.812	16	18 18 19.42	2.5341	25 36 19.6	3.812
17	16 14 33.83	2.8800	25 22 44.2	4.624	17	18 20 51.28	2.5278	25 32 26.1	3.971
18	16 17 14.64	2.8803	25 27 16.0	4.436	18	18 23 22.76	2.5216	25 28 23.1	4.128
19	16 19 55.47	2.8805	25 31 36.5	4.248	19	18 25 53.87	2.5153	25 24 10.7	4.284
20	16 22 36.30	2.8805	25 35 45.8	4.061	20	18 28 24.60	2.5090	25 19 49.0	4.437
21	16 25 17.13	2.8804	25 39 43.8	3.873	21	18 30 54.95	2.5026	25 15 18.2	4.589
22	16 27 57.95	2.8802	25 43 30.5	3.684	22	18 33 24.91	2.4960	25 10 38.3	4.742
23	16 30 38.75	2.8797	S. 25 47 5.9	3.496	23	18 35 54.47	2.4893	S. 25 5 49.2	4.893
THURSDAY 10.					SATURDAY 12.				
0	16 33 19.51	2.8790	S. 25 50 30.0	3.307	0	18 38 23.63	2.4826	S. 25 0 51.1	5.042
1	16 36 0.23	2.8783	25 53 42.8	3.119	1	18 40 52.39	2.4759	24 55 44.2	5.188
2	16 38 40.91	2.8775	25 56 44.3	2.930	2	18 43 20.74	2.4692	24 50 28.5	5.334
3	16 41 21.53	2.8764	25 59 34.4	2.741	3	18 45 48.69	2.4623	24 45 4.1	5.478
4	16 44 2.07	2.8751	26 2 13.2	2.553	4	18 48 16.22	2.4553	24 39 31.1	5.622
5	16 46 42.54	2.8737	26 4 40.8	2.366	5	18 50 43.33	2.4484	24 33 49.5	5.763
6	16 49 22.92	2.8722	26 6 57.1	2.178	6	18 53 10.03	2.4414	24 27 59.5	5.903
7	16 52 3.20	2.8704	26 9 2.1	1.990	7	18 55 36.30	2.4343	24 22 1.1	6.042
8	16 54 43.37	2.8686	26 10 55.9	1.803	8	18 58 2.15	2.4272	24 15 54.5	6.178
9	16 57 23.43	2.8668	26 12 38.5	1.617	9	19 0 27.57	2.4201	24 9 39.7	6.314
10	17 0 3.36	2.8644	26 14 9.9	1.430	10	19 2 52.56	2.4129	24 3 16.8	6.446
11	17 2 43.16	2.8621	26 15 30.1	1.244	11	19 5 17.12	2.4057	23 56 45.9	6.582
12	17 5 22.81	2.8596	26 16 39.2	1.058	12	19 7 41.24	2.3984	23 50 7.0	6.713
13	17 8 2.31	2.8569	26 17 37.1	0.873	13	19 10 4.93	2.3912	23 43 20.3	6.843
14	17 10 41.64	2.8541	26 18 24.0	0.689	14	19 12 28.18	2.3839	23 36 25.9	6.971
15	17 13 20.80	2.8512	26 18 59.8	0.504	15	19 14 51.00	2.3766	23 29 23.8	7.096
16	17 15 59.78	2.8481	26 19 24.5	0.321	16	19 17 13.38	2.3692	23 22 14.2	7.223
17	17 18 38.57	2.8448	26 19 38.3	-0.138	17	19 19 35.31	2.3618	23 14 57.1	7.347
18	17 21 17.16	2.8414	26 19 41.1	+0.044	18	19 21 56.80	2.3545	23 7 32.6	7.469
19	17 23 55.54	2.8379	26 19 33.0	0.325	19	19 24 17.85	2.3472	23 0 0.8	7.590
20	17 26 33.71	2.8342	26 19 14.1	0.406	20	19 26 38.46	2.3398	22 52 21.8	7.709
21	17 29 11.65	2.8303	26 18 44.3	0.586	21	19 28 58.62	2.3323	22 44 35.7	7.827
22	17 31 49.35	2.8264	26 18 3.8	0.765	22	19 31 18.34	2.3249	22 36 42.6	7.943
23	17 34 26.82	2.8224	26 17 12.5	0.943	23	19 33 37.61	2.3175	22 28 42.5	8.058
24	17 37 4.04	2.8182	S. 26 16 10.6	1.120	24	19 35 56.44	2.3102	S. 22 20 35.6	8.172

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 13.					TUESDAY 15.				
0	19 35 56.44	2.3102	S. 22° 20' 35.6"	8.172	0	21 18 48.27	1.9932	S. 14° 4' 29.7"	11.998
1	19 38 14.83	2.3097	22 12 21.9	8.983	1	21 20 47.70	1.9879	13 52 28.3	12.047
2	19 40 32.77	2.2953	22 4 1.6	8.393	2	21 22 46.82	1.9897	13 40 24.0	12.096
3	19 42 50.27	2.2880	21 55 34.7	8.502	3	21 24 45.62	1.9775	13 28 16.8	12.143
4	19 45 7.33	2.2807	21 47 1.3	8.610	4	21 26 44.12	1.9795	13 16 6.8	12.190
5	19 47 23.95	2.2733	21 38 21.5	8.716	5	21 28 42.32	1.9675	13 3 54.0	12.235
6	19 49 40.12	2.2659	21 29 35.4	8.820	6	21 30 40.22	1.9625	12 51 38.6	12.279
7	19 51 55.85	2.2586	21 20 43.1	8.923	7	21 32 37.82	1.9577	12 39 20.5	12.323
8	19 54 11.15	2.2513	21 11 44.6	9.026	8	21 34 35.14	1.9529	12 26 59.8	12.366
9	19 56 26.01	2.2440	21 2 40.0	9.126	9	21 36 32.17	1.9482	12 14 36.7	12.406
10	19 58 40.43	2.2367	20 53 29.5	9.224	10	21 38 28.92	1.9435	12 2 11.1	12.447
11	20 0 54.42	2.2295	20 44 13.1	9.322	11	21 40 25.39	1.9388	11 49 43.1	12.487
12	20 3 7.97	2.2223	20 34 50.9	9.418	12	21 42 21.58	1.9342	11 37 12.7	12.525
13	20 5 21.09	2.2151	20 25 23.0	9.512	13	21 44 17.50	1.9296	11 24 40.1	12.562
14	20 7 33.78	2.2080	20 15 49.5	9.605	14	21 46 13.16	1.9256	11 12 5.3	12.598
15	20 9 46.05	2.2009	20 6 10.4	9.697	15	21 48 8.57	1.9213	10 59 28.3	12.634
16	20 11 57.89	2.1938	19 56 25.8	9.787	16	21 50 3.72	1.9171	10 46 49.2	12.668
17	20 14 9.30	2.1867	19 46 35.9	9.876	17	21 51 58.62	1.9128	10 34 8.1	12.701
18	20 16 20.29	2.1797	19 36 40.7	9.963	18	21 53 53.26	1.9087	10 21 25.1	12.733
19	20 18 30.86	2.1727	19 26 40.3	10.050	19	21 55 47.66	1.9047	10 8 40.1	12.766
20	20 20 41.02	2.1658	19 16 34.7	10.135	20	21 57 41.83	1.9008	9 55 53.2	12.797
21	20 22 50.76	2.1589	19 6 24.1	10.218	21	21 59 35.76	1.8969	9 43 4.5	12.826
22	20 25 0.09	2.1521	18 56 8.5	10.301	22	22 1 29.46	1.8932	9 30 14.1	12.855
23	20 27 9.01	2.1453	S. 18° 45' 48.0"	10.382	23	22 3 22.94	1.8894	S. 9° 17' 21.9"	12.883
MONDAY 14.					WEDNESDAY 16.				
0	20 29 17.53	2.1386	S. 18° 35' 22.7"	10.461	0	22 5 16.19	1.8857	S. 9° 4' 28.1"	12.910
1	20 31 25.65	2.1319	18 24 52.7	10.539	1	22 7 9.23	1.8822	8 51 32.7	12.937
2	20 33 33.36	2.1252	18 14 18.0	10.616	2	22 9 2.06	1.8787	8 38 35.7	12.962
3	20 35 40.67	2.1185	18 3 38.8	10.691	3	22 10 54.67	1.8752	8 25 37.3	12.986
4	20 37 47.58	2.1120	17 52 55.1	10.766	4	22 12 47.08	1.8718	8 12 37.4	13.010
5	20 39 54.11	2.1056	17 42 6.9	10.839	5	22 14 39.29	1.8685	7 59 36.1	13.032
6	20 42 0.25	2.0992	17 31 14.4	10.910	6	22 16 31.30	1.8653	7 46 33.5	13.054
7	20 44 6.01	2.0927	17 20 17.7	10.981	7	22 18 23.12	1.8622	7 33 29.6	13.075
8	20 46 11.38	2.0863	17 9 16.7	11.051	8	22 20 14.76	1.8591	7 20 24.5	13.095
9	20 48 16.37	2.0800	16 58 11.6	11.118	9	22 22 6.21	1.8560	7 7 18.2	13.114
10	20 50 20.98	2.0738	16 47 2.5	11.185	10	22 23 57.48	1.8531	6 54 10.8	13.133
11	20 52 25.23	2.0677	16 35 49.4	11.251	11	22 25 48.58	1.8502	6 41 2.3	13.151
12	20 54 29.11	2.0616	16 24 32.4	11.315	12	22 27 39.51	1.8474	6 27 52.7	13.168
13	20 56 32.62	2.0555	16 13 11.6	11.378	13	22 29 30.27	1.8447	6 14 42.1	13.184
14	20 58 35.77	2.0496	16 1 47.0	11.441	14	22 31 20.87	1.8421	6 1 30.6	13.198
15	21 0 38.57	2.0437	15 50 18.7	11.502	15	22 33 11.32	1.8395	5 48 18.3	13.212
16	21 2 41.01	2.0378	15 38 46.8	11.562	16	22 35 1.61	1.8369	5 35 5.1	13.226
17	21 4 43.10	2.0320	15 27 11.3	11.620	17	22 36 51.75	1.8345	5 21 51.1	13.239
18	21 6 44.85	2.0262	15 15 32.4	11.677	18	22 38 41.75	1.8322	5 8 36.4	13.251
19	21 8 46.25	2.0206	15 3 50.1	11.733	19	22 40 31.61	1.8298	4 55 21.0	13.262
20	21 10 47.32	2.0150	14 52 4.4	11.788	20	22 42 21.33	1.8276	4 42 4.9	13.272
21	21 12 48.05	2.0094	14 40 15.5	11.842	21	22 44 10.92	1.8254	4 28 48.3	13.282
22	21 14 48.45	2.0039	14 28 23.4	11.895	22	22 46 0.38	1.8233	4 15 31.1	13.291
23	21 16 48.52	1.9985	14 16 28.1	11.947	23	22 47 49.72	1.8213	4 2 13.4	13.299
24	21 18 48.27	1.9932	S. 14° 4' 29.7"	11.998	24	22 49 38.94	1.8193	S. 3° 48' 55.2"	13.307

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 17.					SATURDAY 19.				
0	<sup>h</sup> 22 <sup>m</sup> 49 <sup>s</sup> 38.94	1.8193	S. 3° 48' 55.2"	13.307	0	<sup>h</sup> 0 15 59.73	1.8031	N. 6° 43' 55.1"	12.789
1	22 51 28.04	1.8174	3 35 36.6	13.313	1	0 17 47.95	1.8042	6 56 41.2	12.753
2	22 53 17.03	1.8157	3 22 17.7	13.318	2	0 19 36.24	1.8054	7 9 25.5	12.733
3	22 55 5.92	1.8139	3 8 58.4	13.324	3	0 21 24.60	1.8067	7 22 8.0	12.693
4	22 56 54.70	1.8122	2 55 38.8	13.328	4	0 23 13.04	1.8080	7 34 48.7	12.663
5	22 58 43.39	1.8107	2 42 19.1	13.330	5	0 25 1.56	1.8094	7 47 27.5	12.632
6	23 0 31.98	1.8091	2 28 59.2	13.333	6	0 26 50.17	1.8109	8 0 4.5	12.600
7	23 2 20.48	1.8076	2 15 39.1	13.335	7	0 28 38.87	1.8124	8 12 39.5	12.566
8	23 4 8.89	1.8062	2 2 19.0	13.336	8	0 30 27.66	1.8139	8 25 12.4	12.538
9	23 5 57.22	1.8048	1 48 58.8	13.337	9	0 32 16.54	1.8155	8 37 43.3	12.497
10	23 7 45.47	1.8036	1 35 38.6	13.338	10	0 34 5.52	1.8172	8 50 12.1	12.469
11	23 9 33.65	1.8023	1 22 18.5	13.335	11	0 35 54.61	1.8190	9 2 38.7	12.446
12	23 11 21.75	1.8019	1 8 58.4	13.333	12	0 37 43.80	1.8208	9 15 3.2	12.390
13	23 13 9.79	1.8009	0 55 38.5	13.330	13	0 39 33.10	1.8226	9 27 25.5	12.359
14	23 14 57.77	1.7999	0 42 18.8	13.327	14	0 41 22.51	1.8244	9 39 45.4	12.313
15	23 16 45.69	1.7989	0 28 59.2	13.324	15	0 43 12.03	1.8263	9 52 3.0	12.274
16	23 18 33.55	1.7973	0 15 39.9	13.318	16	0 45 1.67	1.8283	10 4 18.3	12.235
17	23 20 21.37	1.7966	S. 0 2 21.0	13.319	17	0 46 51.43	1.8304	10 16 31.2	12.194
18	23 22 9.14	1.7958	N. 0 10 57.6	13.306	18	0 48 41.32	1.8325	10 28 41.6	12.153
19	23 23 56.87	1.7952	0 24 15.8	13.299	19	0 50 31.33	1.8346	10 40 49.5	12.111
20	23 25 44.56	1.7945	0 37 33.5	13.292	20	0 52 21.47	1.8368	10 52 54.9	12.068
21	23 27 32.21	1.7939	0 50 50.8	13.283	21	0 54 11.75	1.8391	11 4 57.7	12.024
22	23 29 19.83	1.7935	1 4 7.5	13.274	22	0 56 2.16	1.8413	11 16 57.8	11.979
23	23 31 7.43	1.7931	N. 1 17 23.7	13.265	23	0 57 52.71	1.8437	N. 11 28 55.2	11.935
FRIDAY 18.					SUNDAY 20.				
0	23 32 55.00	1.7927	N. 1 30 39.3	13.254	0	0 59 43.41	1.8461	N. 11 40 50.0	11.890
1	23 34 42.55	1.7924	1 43 54.2	13.243	1	1 1 34.25	1.8485	11 52 42.0	11.843
2	23 36 30.09	1.7922	1 57 8.4	13.231	2	1 3 25.23	1.8509	12 4 31.1	11.795
3	23 38 17.02	1.7921	2 10 21.9	13.218	3	1 5 16.36	1.8535	12 16 17.4	11.747
4	23 40 5.14	1.7920	2 23 34.6	13.204	4	1 7 7.65	1.8561	12 28 0.8	11.698
5	23 41 52.66	1.7920	2 36 46.4	13.189	5	1 8 59.09	1.8587	12 39 41.2	11.648
6	23 43 40.18	1.7920	2 49 57.3	13.174	6	1 10 50.69	1.8613	12 51 18.6	11.598
7	23 45 27.70	1.7921	3 3 7.3	13.158	7	1 12 42.45	1.8640	13 2 53.0	11.547
8	23 47 15.23	1.7922	3 16 16.3	13.142	8	1 14 34.37	1.8668	13 14 24.2	11.494
9	23 49 2.77	1.7925	3 29 24.4	13.126	9	1 16 26.46	1.8696	13 25 52.3	11.442
10	23 50 50.33	1.7928	3 42 31.4	13.108	10	1 18 18.72	1.8724	13 37 17.2	11.388
11	23 52 37.91	1.7931	3 55 37.3	13.089	11	1 20 11.15	1.8753	13 48 38.9	11.334
12	23 54 25.50	1.7934	4 8 42.1	13.070	12	1 22 3.75	1.8782	13 59 57.3	11.279
13	23 56 13.12	1.7939	4 21 45.7	13.050	13	1 23 56.53	1.8812	14 11 12.4	11.223
14	23 58 0.77	1.7945	4 34 48.1	13.029	14	1 25 49.49	1.8841	14 22 24.1	11.166
15	23 59 48.46	1.7952	4 47 49.2	13.007	15	1 27 42.62	1.8871	14 33 32.3	11.108
16	0 1 36.19	1.7958	5 0 49.0	12.985	16	1 29 35.94	1.8902	14 44 37.1	11.051
17	0 3 23.96	1.7964	5 13 47.4	12.963	17	1 31 29.45	1.8933	14 55 38.4	10.992
18	0 5 11.76	1.7971	5 26 44.5	12.940	18	1 33 23.14	1.8964	15 6 36.1	10.932
19	0 6 59.61	1.7980	5 39 40.2	12.915	19	1 35 17.02	1.8997	15 17 30.2	10.871
20	0 8 47.52	1.7989	5 52 34.3	12.889	20	1 37 11.10	1.9029	15 28 20.6	10.810
21	0 10 35.48	1.7998	6 5 26.9	12.863	21	1 39 5.37	1.9062	15 39 7.4	10.748
22	0 12 23.50	1.8006	6 18 17.9	12.837	22	1 40 59.84	1.9095	15 49 50.4	10.684
23	0 14 11.58	1.8019	6 31 7.3	12.810	23	1 42 54.51	1.9128	16 0 29.5	10.620
24	0 15 59.73	1.8031	N. 6 43 55.1	12.782	24	1 44 49.37	1.9161	N. 16 11 4.8	10.556

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 21.					WEDNESDAY 23.				
0	1 44 49.37	1.9161	N.16 11' 4.8"	10.556	0	3 21 4.81	2.0083	N.23 7' 58.1"	6.507
1	1 46 44.44	1.9195	16 21 36.2	10.491	1	3 23 10.82	2.1081	23 14 25.4	6.403
2	1 48 39.71	1.9229	16 32 3.7	10.425	2	3 25 17.06	2.1058	23 20 46.4	6.298
3	1 50 35.19	1.9264	16 42 27.2	10.357	3	3 27 23.52	2.1006	23 27 1.2	6.194
4	1 52 30.88	1.9299	16 52 46.6	10.289	4	3 29 30.21	2.1133	23 33 9.7	6.088
5	1 54 26.78	1.9333	17 3 1.9	10.221	5	3 31 37.12	2.1171	23 39 11.8	5.981
6	1 56 22.88	1.9368	17 13 13.1	10.152	6	3 33 44.26	2.1208	23 45 7.4	5.873
7	1 58 19.20	1.9405	17 23 20.1	10.081	7	3 35 51.62	2.1244	23 50 56.6	5.766
8	2 0 15.74	1.9441	17 33 22.8	10.010	8	3 37 59.19	2.1280	23 56 39.3	5.658
9	2 2 12.49	1.9477	17 43 21.3	9.938	9	3 40 6.98	2.1317	24 2 15.5	5.548
10	2 4 9.46	1.9513	17 53 15.4	9.865	10	3 42 14.99	2.1353	24 7 45.1	5.438
11	2 6 6.65	1.9550	18 3 5.1	9.792	11	3 44 23.21	2.1388	24 13 8.1	5.327
12	2 8 4.06	1.9587	18 12 50.4	9.718	12	3 46 31.64	2.1423	24 18 24.4	5.216
13	2 10 1.69	1.9624	18 22 31.2	9.643	13	3 48 40.28	2.1458	24 23 34.0	5.104
14	2 11 59.55	1.9662	18 32 7.5	9.567	14	3 50 49.13	2.1493	24 28 36.9	4.992
15	2 13 57.63	1.9699	18 41 39.2	9.490	15	3 52 58.19	2.1527	24 33 33.0	4.878
16	2 15 55.94	1.9737	18 51 6.3	9.412	16	3 55 7.45	2.1560	24 38 22.3	4.764
17	2 17 54.47	1.9774	19 0 28.7	9.333	17	3 57 16.91	2.1593	24 43 4.7	4.649
18	2 19 53.23	1.9812	19 9 46.3	9.254	18	3 59 26.57	2.1627	24 47 40.2	4.533
19	2 21 52.22	1.9851	19 18 59.2	9.175	19	4 1 36.43	2.1659	24 52 8.7	4.418
20	2 23 51.44	1.9889	19 28 7.3	9.094	20	4 3 46.48	2.1691	24 56 30.3	4.302
21	2 25 50.89	1.9928	19 37 10.5	9.013	21	4 5 56.72	2.1723	25 0 44.9	4.184
22	2 27 50.57	1.9967	19 46 8.8	8.930	22	4 8 7.15	2.1754	25 4 52.4	4.067
23	2 29 50.49	2.0006	N.19 55 2.1	8.846	23	4 10 17.77	2.1785	N.25 8 52.9	3.949
TUESDAY 22.					THURSDAY 24.				
0	2 31 50.64	2.0044	N.20 3 50.3	8.762	0	4 12 28.57	2.1815	N.25 12 46.3	3.830
1	2 33 51.02	2.0083	20 12 33.5	8.677	1	4 14 39.55	2.1845	25 16 32.5	3.710
2	2 35 51.64	2.0122	20 21 11.6	8.592	2	4 16 50.71	2.1875	25 20 11.5	3.590
3	2 37 52.49	2.0162	20 29 44.5	8.505	3	4 19 2.05	2.1904	25 23 43.3	3.469
4	2 39 53.58	2.0201	20 38 12.2	8.417	4	4 21 13.56	2.1932	25 27 7.8	3.348
5	2 41 54.90	2.0240	20 46 34.6	8.330	5	4 23 25.23	2.1959	25 30 25.1	3.227
6	2 43 56.46	2.0279	20 54 51.8	8.242	6	4 25 37.07	2.1987	25 33 35.1	3.105
7	2 45 58.25	2.0318	21 3 3.6	8.159	7	4 27 49.07	2.2014	25 36 37.7	2.982
8	2 48 0.28	2.0358	21 11 10.0	8.061	8	4 30 1.23	2.2041	25 39 32.9	2.859
9	2 50 2.55	2.0397	21 19 10.9	7.969	9	4 32 13.56	2.2067	25 42 20.8	2.736
10	2 52 5.05	2.0437	21 27 6.3	7.877	10	4 34 26.04	2.2092	25 45 1.2	2.611
11	2 54 7.79	2.0477	21 34 56.1	7.784	11	4 36 38.66	2.2116	25 47 34.1	2.487
12	2 56 10.77	2.0516	21 42 40.4	7.691	12	4 38 51.43	2.2140	25 49 59.6	2.363
13	2 58 13.98	2.0555	21 50 19.1	7.597	13	4 41 4.34	2.2163	25 52 17.6	2.237
14	3 0 17.43	2.0594	21 57 52.0	7.501	14	4 43 17.39	2.2187	25 54 28.0	2.110
15	3 2 21.11	2.0633	22 5 19.2	7.405	15	4 45 30.58	2.2209	25 56 30.8	1.983
16	3 4 25.03	2.0673	22 12 40.6	7.308	16	4 47 43.90	2.2231	25 58 26.0	1.857
17	3 6 29.19	2.0712	22 19 56.2	7.211	17	4 49 57.35	2.2252	26 0 13.6	1.730
18	3 8 33.58	2.0751	22 27 5.9	7.118	18	4 52 10.92	2.2273	26 1 53.6	1.602
19	3 10 38.20	2.0790	22 34 9.7	7.013	19	4 54 24.61	2.2293	26 3 25.9	1.474
20	3 12 43.06	2.0829	22 41 7.5	6.913	20	4 56 38.42	2.2312	26 4 50.5	1.347
21	3 14 48.15	2.0867	22 47 59.3	6.812	21	4 58 52.35	2.2330	26 6 7.5	1.219
22	3 16 53.47	2.0906	22 54 45.0	6.711	22	5 1 6.38	2.2347	26 7 16.8	1.090
23	3 18 59.02	2.0945	23 1 24.6	6.609	23	5 3 20.52	2.2365	26 8 18.3	0.960
24	3 21 4.81	2.0983	N.23 7 58.1	6.507	24	5 5 34.76	2.2382	N.26 9 12.0	0.830

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 25.					SUNDAY 27.				
0	h m s		N. 26° 9' 12.0"	0.830	0	h m s		N. 24° 17' 17.0"	5.483
1	5 5 34.76	2.3288	26 9 57.9	0.700	1	6 53 40.54	2.9491	24 11 44.2	5.611
2	5 7 49.10	2.3288	26 10 36.0	0.571	2	6 55 55.03	2.9407	24 6 3.7	5.738
3	5 10 3.53	2.9413	26 11 6.4	0.441	3	6 58 9.43	2.9393	24 0 15.6	5.866
4	5 12 18.05	2.9428	26 11 28.9	0.310	4	7 0 23.75	2.9380	23 54 19.8	5.993
5	5 14 32.66	2.9442	26 11 43.6	0.179	5	7 2 37.99	2.9366	23 48 16.4	6.119
6	5 16 47.35	2.9456	26 11 50.4	+0.047	6	7 4 52.14	2.9351	23 42 5.5	6.245
7	5 19 2.12	2.9467	26 11 49.3	-0.084	7	7 7 6.20	2.9336	23 35 47.0	6.372
8	5 21 16.96	2.9479	26 11 40.3	0.215	8	7 9 20.17	2.9321	23 29 20.9	6.498
9	5 23 31.87	2.9491	26 11 23.5	0.346	9	7 11 34.05	2.9305	23 22 47.3	6.623
10	5 25 46.85	2.9503	26 10 58.8	0.478	10	7 13 47.83	2.9288	23 16 6.2	6.747
11	5 28 1.89	2.9511	26 10 26.1	0.611	11	7 16 1.51	2.9279	23 9 17.7	6.871
12	5 30 16.98	2.9520	26 9 45.5	0.743	12	7 18 15.10	2.9267	23 2 21.7	6.995
13	5 32 32.13	2.9529	26 8 57.0	0.875	13	7 20 28.59	2.9249	22 55 18.3	7.118
14	5 34 47.33	2.9537	26 8 0.5	1.007	14	7 22 41.98	2.9232	22 48 7.5	7.241
15	5 37 2.57	2.9544	26 6 56.1	1.139	15	7 24 55.26	2.9204	22 40 49.4	7.363
16	5 39 17.86	2.9552	26 5 43.8	1.272	16	7 27 8.43	2.9186	22 33 23.9	7.485
17	5 41 33.19	2.9558	26 4 23.5	1.405	17	7 29 21.49	2.9168	22 25 51.2	7.606
18	5 43 48.55	2.9568	26 2 55.2	1.537	18	7 31 34.45	2.9151	22 18 11.2	7.727
19	5 46 3.93	2.9566	26 1 19.0	1.670	19	7 33 47.30	2.9132	22 10 24.0	7.847
20	5 48 19.34	2.9570	25 59 34.8	1.803	20	7 36 0.04	2.9113	22 2 29.6	7.967
21	5 50 34.77	2.9574	25 57 42.6	1.936	21	7 38 12.66	2.9094	21 54 26.0	8.088
22	5 52 50.23	2.9577	25 55 42.5	2.069	22	7 40 25.17	2.9076	21 46 19.3	8.204
23	5 55 5.70	2.9578	N. 25 53 34.4	2.202	23	7 42 37.57	2.9057	N. 21 38 3.5	8.323
24	5 57 21.17	2.9579				7 44 49.86	2.9038		
SATURDAY 26.					MONDAY 28.				
0	5 59 36.65	2.9580	N. 25 51 18.3	2.334	0	7 47 2.03	2.9019	N. 21 29 40.5	8.441
1	6 1 52.13	2.9580	25 48 54.3	2.467	1	7 49 14.09	2.9000	21 21 10.5	8.558
2	6 4 7.61	2.9580	25 46 22.3	2.600	2	7 51 26.03	2.1980	21 12 33.6	8.673
3	6 6 23.09	2.9579	25 43 42.3	2.733	3	7 53 37.85	2.1960	21 3 49.7	8.789
4	6 8 38.56	2.9577	25 40 54.4	2.865	4	7 55 49.55	2.1941	20 54 58.9	8.904
5	6 10 54.01	2.9574	25 37 58.5	2.998	5	7 58 1.14	2.1922	20 46 1.2	9.019
6	6 13 9.45	2.9573	25 34 54.6	3.131	6	7 58 12.61	2.1909	20 36 56.6	9.133
7	6 15 24.87	2.9568	25 31 42.8	3.263	7	8 0 23.96	2.1889	20 27 45.2	9.247
8	6 17 40.26	2.9563	25 28 23.1	3.394	8	8 4 35.20	2.1863	20 18 27.0	9.359
9	6 19 55.63	2.9558	25 24 55.5	3.527	9	8 6 46.32	2.1843	20 9 2.1	9.471
10	6 22 10.96	2.9553	25 21 19.9	3.659	10	8 8 57.32	2.1823	19 59 30.5	9.589
11	6 24 26.26	2.9547	25 17 36.4	3.791	11	8 11 8.20	2.1804	19 49 52.2	9.693
12	6 26 41.52	2.9540	25 13 45.0	3.922	12	8 13 18.97	2.1785	19 40 7.3	9.803
13	6 28 56.74	2.9533	25 9 45.7	4.053	13	8 15 29.62	2.1765	19 30 15.8	9.913
14	6 31 11.91	2.9525	25 5 38.6	4.184	14	8 17 40.15	2.1746	19 20 17.8	10.022
15	6 33 27.04	2.9517	25 1 23.6	4.315	15	8 19 50.57	2.1727	19 10 13.2	10.130
16	6 35 42.12	2.9508	24 57 0.8	4.446	16	8 22 0.87	2.1708	19 0 2.2	10.237
17	6 37 57.14	2.9499	24 52 30.1	4.577	17	8 24 11.06	2.1689	18 49 44.8	10.343
18	6 40 12.11	2.9490	24 47 51.5	4.708	18	8 26 21.14	2.1671	18 39 21.0	10.450
19	6 42 27.02	2.9479	24 43 5.1	4.838	19	8 28 31.11	2.1652	18 28 50.8	10.555
20	6 44 41.86	2.9468	24 38 11.0	4.967	20	8 30 40.96	2.1633	18 18 14.4	10.659
21	6 46 56.64	2.9457	24 33 9.1	5.096	21	8 32 50.70	2.1614	18 7 31.7	10.763
22	6 49 11.35	2.9445	24 27 59.5	5.225	22	8 35 0.33	2.1596	17 56 42.8	10.868
23	6 51 25.98	2.9433	24 22 42.1	5.354	23	8 37 9.85	2.1578	17 45 47.8	10.968
24	6 53 40.54	2.9421	N. 24 17 17.0	5.483	24	8 39 19.27	2.1561	N. 17 34 46.6	11.070

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 29.					WEDNESDAY 30.				
0	<sup>h</sup> 8 <sup>m</sup> 39 <sup>s</sup> 19.27	2.1561	N. 17° 34' 46.6"	11.070	0	<sup>h</sup> 9 <sup>m</sup> 30 <sup>s</sup> 37.80	2.1233	N. 12° 41' 48.7"	13.909
1	8 41 28.58	2.1543	17 23 39.4	11.170	1	9 32 45.17	2.1225	12 28 30.5	13.343
2	8 43 37.79	2.1526	17 12 26.2	11.371	2	9 34 52.50	2.1217	12 15 7.5	13.422
3	8 45 46.89	2.1508	17 1 6.9	11.371	3	9 36 59.78	2.1210	12 1 39.8	13.501
4	8 47 55.89	2.1492	16 49 41.7	11.469	4	9 39 7.02	2.1203	11 48 7.4	13.578
5	8 50 4.79	2.1476	16 38 10.7	11.566	5	9 41 14.22	2.1197	11 34 30.4	13.655
6	8 52 13.60	2.1460	16 26 33.8	11.663	6	9 43 21.38	2.1191	11 20 48.8	13.731
7	8 54 22.31	2.1444	16 14 51.1	11.759	7	9 45 28.51	2.1186	11 7 2.7	13.806
8	8 56 30.93	2.1428	16 3 2.7	11.854	8	9 47 35.61	2.1180	10 53 12.1	13.879
9	8 58 39.45	2.1413	15 51 8.6	11.948	9	9 49 42.69	2.1178	10 39 17.2	13.951
10	9 0 47.88	2.1398	15 39 8.9	12.042	10	9 51 49.75	2.1175	10 25 18.0	14.023
11	9 2 56.23	2.1384	15 27 3.6	12.135	11	9 53 56.79	2.1172	10 11 14.5	14.094
12	9 5 4.49	2.1369	15 14 52.7	12.227	12	9 56 3.81	2.1169	9 57 6.7	14.164
13	9 7 12.66	2.1356	15 2 36.3	12.318	13	9 58 10.82	2.1168	9 42 54.8	14.233
14	9 9 20.76	2.1343	14 50 14.5	12.408	14	10 0 17.83	2.1167	9 28 38.9	14.298
15	9 11 28.78	2.1330	14 37 47.3	12.498	15	10 2 24.83	2.1167	9 14 19.0	14.365
16	9 13 36.72	2.1317	14 25 14.7	12.587	16	10 4 31.83	2.1167	8 59 55.1	14.431
17	9 15 44.59	2.1305	14 12 36.9	12.674	17	10 6 38.83	2.1167	8 45 27.3	14.495
18	9 17 52.38	2.1293	13 59 53.9	12.760	18	10 8 45.84	2.1169	8 30 55.7	14.558
19	9 20 0.10	2.1282	13 47 5.7	12.846	19	10 10 52.86	2.1172	8 16 20.4	14.620
20	9 22 7.76	2.1272	13 34 12.4	12.932	20	10 12 59.90	2.1175	8 1 41.3	14.682
21	9 24 15.36	2.1262	13 21 13.9	13.017	21	10 15 6.96	2.1178	7 46 58.6	14.741
22	9 26 22.90	2.1252	13 8 10.4	13.099	22	10 17 14.04	2.1182	7 32 12.4	14.799
23	9 28 30.38	2.1242	12 55 2.0	13.181	23	10 19 21.15	2.1187	7 17 22.7	14.857
24	9 30 37.80	2.1233	N. 12° 41' 48.7"	13.262	24	10 21 28.29	2.1192	N. 7° 2' 29.6"	14.913

PHASES OF THE MOON.

○ Full Moon, . . . . .	<sup>d</sup> 6 <sup>h</sup> 10 <sup>m</sup> 24.6
☾ Last Quarter, . . . . .	13 2 9.4
● New Moon, . . . . .	21 1 55.5
☾ First Quarter, . . . . .	29 2 16.2

☾ Perigee, . . . . .	<sup>d</sup> 6 <sup>h</sup> 22.1
☾ Apogee, . . . . .	21 6.1

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VII <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	SUN W.	107° 14' 57"	2946	108° 46' 17"	2927	110° 18' 2"	2907	111° 50' 12"	2887
	Venus W.	79 32 33	3039	81 2 10	3009	82 32 12	2969	84 2 39	2968
	Aldebaran W.	50 47 14	2690	52 24 7	2668	54 1 30	2646	55 39 23	2623
	Spica E.	83 32 0	2587	81 53 1	2579	80 13 37	2561	78 33 48	2542
2	SUN W.	119 37 27	2788	121 12 11	2767	122 47 22	2747	124 22 59	2726
	Venus W.	91 41 31	2682	93 14 38	2641	94 48 13	2620	96 22 15	2599
	Aldebaran W.	63 56 21	2515	65 37 14	2494	67 18 36	2473	69 0 27	2452
	Pollux W.	21 47 26	2597	23 26 25	2558	25 6 18	2522	26 47 1	2489
	Spica E.	70 8 11	2448	68 25 44	2429	66 42 50	2410	64 59 29	2391
	Antares E.	115 53 54	2441	114 11 18	2422	112 28 15	2403	110 44 44	2384
3	Venus W.	104 19 11	2686	105 55 56	2677	107 33 7	2658	109 10 43	2639
	Aldebaran W.	77 36 58	2333	79 21 41	2334	81 6 51	2315	82 52 28	2296
	Pollux W.	35 21 4	2355	37 5 44	2332	38 50 57	2309	40 36 43	2288
	Spica E.	56 16 1	2299	54 30 0	2281	52 43 32	2264	50 56 39	2247
	Antares E.	102 0 23	2280	100 14 9	2272	98 27 29	2255	96 40 23	2237
4	Aldebaran W.	91 46 57	2214	93 35 4	2196	95 23 34	2184	97 12 25	2170
	Pollux W.	49 33 4	2192	51 21 43	2174	53 10 49	2158	55 0 20	2149
	Spica E.	41 56 4	2167	40 6 47	2153	38 17 8	2139	36 27 9	2126
	Antares E.	87 38 28	2154	85 48 51	2139	83 58 51	2124	82 8 28	2110
5	Aldebaran W.	106 21 34	2112	108 12 15	2103	110 3 10	2094	111 54 18	2086
	Pollux W.	64 13 34	2074	66 5 13	2062	67 57 11	2052	69 49 25	2042
	Regulus W.	27 11 22	2069	29 3 9	2056	30 55 16	2044	32 47 42	2033
	Spica E.	27 12 42	2075	25 21 5	2069	23 29 18	2064	21 37 24	2062
	Antares E.	72 51 24	2046	70 59 2	2036	69 6 24	2026	67 13 30	2017
6	Pollux W.	79 14 2	2003	81 7 31	1998	83 1 8	1994	84 54 51	1991
	Regulus W.	42 13 42	1991	44 7 30	1986	46 1 27	1981	47 55 31	1977
	Antares E.	57 45 45	1981	55 51 40	1976	53 57 28	1972	52 3 10	1968
	α Aquilæ E.	109 40 36	2054	108 2 54	2035	106 24 46	2018	104 46 15	2003
7	Pollux W.	94 24 19	1987	96 18 14	1968	98 12 7	1991	100 5 56	1994
	Regulus W.	57 26 56	1970	59 21 17	1972	61 15 35	1974	63 9 50	1977
	Antares E.	42 30 45	1964	40 36 14	1966	38 41 46	1968	36 47 22	1971
	α Aquilæ E.	96 29 40	2562	94 49 53	2561	93 10 4	2561	91 30 15	2562
	Mars E.	108 53 51	2180	107 4 54	2182	105 16 0	2185	103 27 10	2182
8	Pollux W.	109 33 14	2032	111 26 12	2032	113 18 57	2041	115 11 28	2050
	Regulus W.	72 39 33	2003	74 33 3	2010	76 26 21	2019	78 19 26	2027
	Spica W.	18 43 48	2048	20 36 7	2047	22 28 28	2049	24 20 46	2053
	Antares E.	27 16 57	1998	25 23 20	2006	23 29 55	2015	21 36 44	2024
	α Aquilæ E.	83 12 41	2001	81 33 47	2014	79 55 11	2029	78 16 56	2046
	Mars E.	94 24 34	2216	92 36 31	2224	90 48 39	2233	89 1 0	2243
	Fomalhaut E.	107 59 30	2419	106 16 23	2419	104 33 16	2420	102 50 10	2423
	Jupiter E.	112 0 54	2064	110 9 0	2072	108 17 18	2080	106 25 48	2089
9	Regulus W.	87 41 8	2061	89 32 36	2064	91 23 45	2106	93 14 35	2119
	Spica W.	33 39 58	2094	35 31 7	2104	37 22 0	2116	39 12 35	2128
	α Aquilæ E.	70 12 25	2765	68 37 11	2795	67 2 36	2827	65 28 43	2862
	Mars E.	80 6 37	2299	78 20 36	2313	76 34 55	2326	74 49 34	2341





## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
9	Fomalhaut E.	94 16 25	9400	92 34 15	9471	90 52 21	9484	89 10 45	9498
	Jupiter E.	97 12 4	9143	95 22 10	9155	93 32 35	9169	91 43 20	9189
10	Regulus W.	102 23 23	9193	104 12 1	9209	106 0 15	9226	107 48 4	9242
	Spica W.	48 20 31	9198	50 9 2	9213	51 57 10	9229	53 44 55	9245
	$\alpha$ Aquilæ E.	57 51 43	9069	56 23 11	9138	54 55 45	9125	53 29 30	9058
	Mars E.	66 8 13	9419	64 25 6	9436	62 42 22	9453	61 0 3	9470
	Fomalhaut E.	80 48 8	9594	79 8 51	9604	77 30 2	9626	75 51 43	9649
	Jupiter E.	82 42 24	9257	80 55 21	9279	79 8 41	9289	77 22 25	9306
	$\alpha$ Pegasi E.	101 53 7	9354	100 8 26	9368	98 24 5	9399	96 40 5	9398
	Sun E.	129 35 27	9590	127 54 41	9535	126 14 17	9551	124 34 15	9568
11	Spica W.	62 37 39	9398	64 22 58	9345	66 7 52	9369	67 52 21	9379
	Antares W.	16 48 46	9383	18 34 12	9240	20 19 13	9257	22 3 50	9274
	$\alpha$ Aquilæ E.	46 38 27	9358	45 20 55	9361	44 5 12	9379	42 51 24	9393
	Mars E.	52 34 42	9509	50 54 55	9580	49 15 33	9599	47 36 37	9618
	Fomalhaut E.	67 48 19	9780	66 13 25	9811	64 39 11	9849	63 5 37	9875
	Jupiter E.	68 37 17	9392	66 53 31	9410	65 10 10	9426	63 27 15	9445
	$\alpha$ Pegasi E.	88 5 43	9480	86 24 2	9499	84 42 47	9517	83 1 57	9535
	Sun E.	116 19 56	9655	114 42 16	9674	113 5 1	9699	111 28 10	9710
12	Spica W.	76 28 37	9466	78 10 38	9483	79 52 15	9500	81 33 28	9517
	Antares W.	30 40 42	9460	32 22 51	9478	34 4 35	9495	35 45 55	9519
	Mars E.	39 28 29	9716	37 52 10	9735	36 16 16	9754	34 40 48	9774
	Jupiter E.	54 59 1	9537	53 18 39	9554	51 38 41	9579	49 59 8	9591
	Fomalhaut E.	55 28 57	9664	54 0 3	9108	52 32 3	9154	51 4 59	9204
	$\alpha$ Pegasi E.	74 44 21	9833	73 6 11	9854	71 28 29	9874	69 51 14	9895
	Sun E.	103 30 1	9808	101 55 36	9821	100 21 35	9839	98 47 58	9858
13	Spica W.	89 53 42	9600	91 32 37	9618	93 11 10	9639	94 49 21	9648
	Antares W.	44 6 45	9596	45 45 46	9611	47 24 26	9626	49 2 45	9642
	Mars E.	26 49 59	9875	25 17 8	9896	23 44 44	9918	22 12 48	9941
	Jupiter E.	41 47 33	9680	40 10 26	9698	38 33 43	9715	36 57 23	9733
	Fomalhaut E.	44 5 31	9508	42 45 13	9581	41 26 18	9663	40 8 51	9751
	$\alpha$ Pegasi E.	61 52 9	9805	60 17 47	9826	58 43 56	9859	57 10 35	9876
	Sun E.	91 5 42	9947	89 34 23	9965	88 3 26	9981	86 32 50	9996
14	Spica W.	102 55 7	9739	104 31 17	9737	106 7 8	9750	107 42 41	9764
	Antares W.	57 9 9	9717	58 45 27	9731	60 21 26	9744	61 57 7	9758
	Jupiter E.	29 1 37	9822	27 27 38	9842	25 54 4	9861	24 20 55	9881
	$\alpha$ Pegasi E.	49 31 48	9906	48 1 43	9935	46 32 14	9966	45 3 23	9996
	Sun E.	79 4 59	9979	77 36 24	9995	76 8 8	9110	74 40 11	9194
15	Spica W.	115 36 7	9898	117 9 59	9839	118 43 36	9851	120 16 58	9869
	Antares W.	60 51 14	9821	71 25 15	9839	72 59 1	9844	74 32 32	9855
	Sun E.	67 24 44	9194	65 58 28	9308	64 32 28	9390	63 6 43	9438
16	Antares W.	82 16 44	9905	83 48 57	9914	85 20 58	9923	86 52 48	9939
	$\alpha$ Aquilæ W.	39 8 31	4811	40 7 58	4899	41 8 58	4900	42 11 23	4909
	Sun E.	56 1 30	9291	54 37 8	9301	53 12 58	9319	51 49 1	9332
17	Antares W.	94 29 20	9970	96 0 10	9977	97 30 52	9983	99 1 26	9989
	$\alpha$ Aquilæ W.	47 40 59	4179	48 49 45	4130	49 59 18	4086	51 9 33	4045

## GREENWICH MEAN TIME.

## LUNAR DISTANCES

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
9	Fomalhaut	E.	87° 29' 29"	2513	85° 48' 34"	2529	84° 8' 1"	2546	82° 27' 52"	2564
	Jupiter	E.	89 54 25	2196	88 5 51	2210	86 17 39	2226	84 29 50	2241
10	Regulus	W.	109 35 29	2259	111 22 29	2275	113 9 5	2292	114 55 16	2310
	Spica	W.	55 32 16	2261	57 19 13	2277	59 5 46	2294	60 51 55	2311
	α Aquilæ	E.	52 4 29	2395	50 40 47	2399	49 18 29	2478	47 57 40	2565
	Mars	E.	59 18 8	2488	57 36 38	2507	55 55 34	2525	54 14 55	2543
	Fomalhaut	E.	74 13 55	2673	72 36 39	2698	70 59 57	2795	69 23 50	2752
	Jupiter	E.	75 36 34	2322	73 51 7	2339	72 6 5	2357	70 21 28	2375
	α Pegasi	E.	94 56 27	2413	93 13 11	2439	91 30 18	2445	89 47 48	2463
	Sun	E.	122 54 36	2585	121 15 20	2602	119 36 28	2680	117 58 0	2637
11	Spica	W.	69 36 26	2396	71 20 6	2414	73 3 21	2431	74 46 11	2446
	Antares	W.	23 48 2	2391	25 31 49	2409	27 15 11	2426	28 58 9	2443
	α Aquilæ	E.	41 39 38	2129	40 30 4	2178	39 22 51	2441	38 18 7	2493
	Mars	E.	45 58 7	2638	44 20 3	2657	42 42 25	2677	41 5 14	2696
	Fomalhaut	E.	61 32 46	2909	60 0 39	2945	58 29 17	2969	56 58 42	3022
	Jupiter	E.	61 44 45	2463	60 2 40	2482	58 21 1	2500	56 39 48	2519
	α Pegasi	F.	81 21 33	2554	79 41 35	2573	78 2 3	2593	76 22 58	2613
	Sun	E.	109 51 43	2729	108 15 41	2747	106 40 3	2766	105 4 50	2784
12	Spica	W.	83 14 17	2535	84 54 42	2551	86 34 44	2567	88 14 24	2583
	Antares	W.	37 26 51	2529	39 7 24	2545	40 47 34	2562	42 27 21	2579
	Mars	E.	33 5 46	2794	31 31 10	2814	29 57 0	2834	28 23 16	2856
	Jupiter	E.	48 20 0	2808	46 41 16	2826	45 2 57	2845	43 25 3	2863
	Fomalhaut	E.	49 38 55	2856	48 13 52	2913	46 49 55	2972	45 27 7	3036
	α Pegasi	E.	68 14 28	2717	66 38 11	2738	65 2 22	2760	63 27 1	2782
	Sun	E.	97 14 45	2876	95 41 55	2894	94 9 28	2912	92 37 24	2929
13	Spica	W.	96 27 11	2663	98 4 40	2678	99 41 49	2693	101 18 38	2708
	Antares	W.	50 40 43	2657	52 18 20	2673	53 55 36	2688	55 32 32	2702
	Mars	E.	20 41 21	2964	19 10 23	2989	17 39 57	3018	16 10 6	3049
	Jupiter	E.	35 21 27	2751	33 45 55	2769	32 10 46	2786	30 36 0	2804
	Fomalhaut	E.	38 52 58	2949	37 38 46	2966	36 26 23	2975	35 15 57	2996
	α Pegasi	E.	55 37 45	2901	54 5 27	2926	52 33 41	2952	51 2 28	2978
	Sun	E.	85 2 35	3015	83 32 41	3031	82 3 7	3048	80 33 53	3064
14	Spica	W.	109 17 56	2777	110 52 54	2790	112 27 35	2803	114 1 59	2815
	Antares	W.	63 32 30	2771	65 7 36	2784	66 42 25	2797	68 16 57	2808
	Jupiter	E.	22 48 12	2902	21 15 56	2924	19 44 8	2949	18 12 51	2972
	α Pegasi	E.	43 35 11	3132	42 7 40	3168	40 40 52	3205	39 14 49	3246
	Sun	E.	73 12 31	3139	71 45 9	3153	70 18 4	3167	68 51 16	3181
15	Spica	W.	121 50 5	2873	123 22 58	2884	124 55 37	2894	126 28 3	2903
	Antares	W.	76 5 49	2886	77 38 52	2876	79 11 42	2886	80 44 19	2895
	Sun	E.	61 41 12	2945	60 15 56	2957	58 50 54	2968	57 26 5	2980
16	Antares	W.	88 24 26	2940	89 55 54	2948	91 27 12	2955	92 58 21	2963
	α Aquilæ	W.	43 15 7	2498	44 20 3	2536	45 26 4	2592	46 33 4	2633
	Sun	E.	50 25 15	3332	49 1 41	3343	47 38 19	3352	46 15 8	3361
17	Antares	W.	100 31 52	2995	102 2 11	3001	103 32 22	3007	105 2 26	3012
	α Aquilæ	W.	52 20 28	4009	53 31 59	3976	54 44 2	3946	55 56 35	3918

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
17	Mars	W.	21° 0' 41"	3288	22° 25' 6"	3280	23° 49' 29"	3293	25° 13' 49"	3296
	SUN	E.	44 52 7	3371	43 29 17	3360	42 6 38	3369	40 44 9	3396
18	α Aquilæ	W.	57 9 37	3283	58 23 4	3269	59 36 55	3248	60 51 8	3298
	Mars	W.	32 14 31	3313	33 38 27	3317	35 2 19	3390	36 26 7	3394
	Jupiter	W.	20 8 34	3158	21 35 34	3154	23 2 38	3151	24 29 46	3149
	SUN	E.	33 54 17	3444	32 32 50	3453	31 11 33	3463	29 50 27	3473
19	Mars	W.	43 24 9	3339	44 47 35	3342	46 10 58	3345	47 34 18	3346
	Jupiter	W.	31 45 40	3149	33 12 50	3150	34 39 59	3150	36 7 8	3152
	SUN	E.	23 8 7	3537	21 48 24	3555	20 29 1	3577	19 10 2	3602
23	SUN	W.	21 23 3	3551	22 42 31	3535	24 2 16	3521	25 22 17	3508
	Pollux	E.	57 25 6	3099	55 56 47	3091	54 28 26	3089	53 0 3	3087
	Regulus	E.	94 14 15	3083	92 45 20	3080	91 16 22	3058	89 47 21	3055
24	SUN	W.	32 5 32	3458	33 26 43	3448	34 48 5	3439	36 9 37	3431
	Pollux	E.	45 37 37	3078	44 9 1	3077	42 40 23	3075	41 11 43	3073
	Regulus	E.	82 21 10	3034	80 51 40	3030	79 22 5	3026	77 52 25	3022
25	SUN	W.	42 59 44	3387	44 22 15	3378	45 44 56	3369	47 7 48	3360
	Pollux	E.	33 47 54	3069	32 19 6	3069	30 50 18	3070	29 21 32	3073
	Regulus	E.	70 22 25	2993	68 52 3	2985	67 21 32	2979	65 50 53	2973
26	SUN	W.	54 4 52	3310	55 28 52	3300	56 53 4	3288	58 17 29	3276
	Aldebaran	W.	23 9 54	3305	24 34 0	3253	25 59 6	3209	27 25 5	3169
	Venus	W.	20 40 12	3404	22 2 24	3390	23 24 52	3376	24 47 36	3362
	Regulus	E.	58 15 17	2939	56 43 39	2924	55 11 50	2914	53 39 49	2905
	Spica	E.	112 18 42	2931	110 47 2	2922	109 15 11	2912	107 43 7	2902
27	SUN	W.	65 23 1	3215	66 48 52	3203	68 14 58	3190	69 41 19	3177
	Aldebaran	W.	34 45 29	3019	36 15 18	2995	37 45 37	2972	39 16 25	2949
	Venus	W.	31 45 13	3294	33 9 32	3279	34 34 8	3265	35 59 1	3250
	Regulus	E.	45 56 41	2954	44 23 23	2943	42 49 51	2932	41 16 5	2921
	Spica	E.	99 59 33	2948	98 26 7	2937	96 52 27	2925	95 18 32	2913
28	SUN	W.	76 57 20	3103	78 25 26	3087	79 53 51	3072	81 22 35	3056
	Aldebaran	W.	46 57 10	2948	48 30 36	2926	50 4 27	2910	51 38 42	2791
	Venus	W.	43 7 50	3173	44 34 31	3157	46 1 32	3141	47 28 52	3124
	Regulus	E.	33 23 25	2761	31 48 6	2749	30 12 31	2737	28 36 40	2725
	Spica	E.	87 24 47	2747	85 49 9	2733	84 13 13	2718	82 36 57	2704
29	SUN	W.	88 51 20	2972	90 22 8	2954	91 53 19	2936	93 24 52	2919
	Aldebaran	W.	59 36 9	2997	61 12 53	2979	62 50 1	2960	64 27 34	2942
	Venus	W.	54 50 43	3037	56 20 10	3019	57 49 59	3001	59 20 11	2981
	Spica	E.	74 30 38	2997	72 52 20	2911	71 13 40	2904	69 34 37	2877
30	SUN	W.	101 8 21	2987	102 42 14	2968	104 16 32	2789	105 51 14	2770
	Aldebaran	W.	72 41 38	2549	74 21 43	2530	76 2 14	2512	77 43 11	2494
	Venus	W.	66 57 6	2987	68 29 42	2968	70 2 42	2948	71 36 8	2928
	Pollux	W.	30 32 4	2577	32 11 30	2551	33 51 32	2527	35 32 8	2503
	Spica	E.	61 13 39	2494	59 32 17	2476	57 50 30	2459	56 8 19	2442
	Antares	E.	106 57 38	2485	105 16 5	2469	103 34 8	2451	101 51 46	2433

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
17	Mars	W.	26° 38' 5"	3300	28° 2' 17"	3309	29° 26' 26"	3306	30° 50' 31"	3310
	Sun	E.	39 21 50	3407	37 59 41	3416	36 37 43	3425	35 15 55	3434
18	α Aquilæ	W.	62 5 41	3811	63 20 32	3794	64 35 40	3780	65 51 3	3768
	Mars	W.	37 49 51	3327	39 13 31	3331	40 37 7	3333	42 0 40	3337
	Jupiter	W.	25 56 56	3148	27 24 7	3148	28 51 18	3148	30 18 29	3148
	Sun	E.	28 29 33	3484	27 8 51	3486	25 48 22	3508	24 28 7	3529
19	Mars	W.	48 57 36	3349	50 20 51	3351	51 44 3	3353	53 7 13	3355
	Jupiter	W.	37 34 15	3153	39 1 21	3153	40 28 26	3154	41 55 30	3154
	Sun	E.	17 51 30	3632	16 33 30	3667	15 16 8	3713	13 59 35	3773
23	Sun	W.	26 42 32	3497	28 3 0	3486	29 23 40	3476	30 44 31	3467
	Pollux	E.	51 31 38	3086	50 3 11	3084	48 34 42	3082	47 6 11	3080
	Regulus	E.	88 18 16	3052	86 49 7	3047	85 19 53	3043	83 50 34	3039
24	Sun	W.	37 31 19	3422	38 53 11	3414	40 15 12	3405	41 37 23	3396
	Pollux	E.	39 43 0	3071	38 14 15	3070	36 45 29	3069	35 16 42	3068
	Regulus	E.	76 22 39	3016	74 52 46	3010	73 22 46	3005	71 52 39	3000
25	Sun	W.	48 30 50	3351	49 54 3	3347	51 17 28	3331	52 41 4	3320
	Pollux	E.	27 52 50	3077	26 24 12	3063	24 55 41	3091	23 27 20	3101
	Regulus	E.	64 20 5	2965	62 49 8	2957	61 18 1	2949	59 46 44	2941
26	Sun	W.	59 42 8	3265	61 7 0	3253	62 32 6	3241	63 57 26	3229
	Aldebaran	W.	28 51 51	3133	30 19 20	3101	31 47 28	3079	33 16 12	3045
	Venus	W.	26 10 36	3348	27 33 52	3335	28 57 23	3321	30 21 10	3307
	Regulus	E.	52 7 37	2986	50 35 13	2986	49 2 36	2975	47 29 45	2965
	Spica	E.	106 10 51	2892	104 38 22	2882	103 5 40	2871	101 32 44	2859
27	Sun	W.	71 7 56	3163	72 34 50	3148	74 2 2	3133	75 29 32	3118
	Aldebaran	W.	40 47 42	2986	42 19 25	2906	43 51 34	2887	45 24 9	2867
	Venus	W.	37 24 11	3236	38 49 39	3220	40 15 24	3204	41 41 28	3189
	Regulus	E.	39 42 4	2909	38 7 48	2797	36 33 16	2785	34 58 28	2773
	Spica	E.	93 44 21	2800	92 9 53	2786	90 35 9	2774	89 0 7	2760
28	Sun	W.	82 51 39	3039	84 21 4	3022	85 50 49	3006	87 20 54	2989
	Aldebaran	W.	53 13 22	2772	54 48 27	2753	56 23 56	2735	57 59 50	2716
	Venus	W.	48 56 32	3107	50 24 33	3090	51 52 55	3073	53 21 38	3055
	Regulus	E.	27 0 33	2713	25 24 10	2701	23 47 32	2691	22 10 40	2681
	Spica	E.	81 0 22	2689	79 23 27	2673	77 46 11	2658	76 8 35	2643
29	Sun	W.	94 56 47	2901	96 29 5	2882	98 1 47	2864	99 34 52	2845
	Aldebaran	W.	66 5 32	2694	67 43 55	2694	69 22 44	2686	71 1 58	2667
	Venus	W.	60 50 47	2963	62 21 46	2945	63 53 8	2925	65 24 55	2906
	Spica	E.	67 55 11	2561	66 15 22	2545	64 35 11	2528	62 54 37	2511
30	Sun	W.	107 26 21	2752	109 1 52	2733	110 37 48	2714	112 14 9	2695
	Aldebaran	W.	79 24 33	2475	81 6 21	2457	82 48 35	2438	84 31 15	2421
	Venus	W.	73 9 59	2909	74 44 15	2789	76 18 57	2770	77 54 4	2750
	Pollux	W.	37 13 17	2480	38 54 59	2458	40 37 12	2438	42 19 55	2415
	Spica	E.	54 25 44	2484	52 42 44	2468	50 59 20	2450	49 15 31	2433
	Antares	E.	100 8 59	2416	98 25 47	2398	96 42 10	2380	94 58 7	2363

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
Thur.	1	<sup>h</sup> 2 <sup>m</sup> 33 <sup>s</sup> 10.94	9.536	N. 15° 3' 2.2"	+45.42	15' 54".28	66.06	<sup>m</sup> 2 58.79	<sup>s</sup> 0.318
Frid.	2	2 37 0.09	9.559	15 21 4.8	44.79	15 54.05	66.13	3 6.18	0.206
Sat.	3	2 40 49.77	9.581	15 38 52.1	44.15	15 53.82	66.21	3 13.05	0.274
Sun.	4	2 44 39.97	9.603	15 56 24.1	43.51	15 53.59	66.29	3 19.39	0.252
Mon.	5	2 48 30.72	9.626	16 13 40.4	42.86	15 53.36	66.37	3 25.18	0.229
Tues.	6	2 52 22.03	9.650	16 30 40.4	42.17	15 53.14	66.45	3 30.40	0.206
Wed.	7	2 56 13.91	9.675	16 47 24.1	41.47	15 52.91	66.53	3 35.07	0.183
Thur.	8	3 0 6.36	9.699	17 3 51.0	40.77	15 52.69	66.62	3 39.16	0.159
Frid.	9	3 3 59.40	9.723	17 20 1.0	40.06	15 52.47	66.70	3 42.67	0.134
Sat.	10	3 7 53.03	9.747	17 35 53.8	39.33	15 52.25	66.78	3 45.58	0.109
Sun.	11	3 11 47.27	9.771	17 51 29.1	38.59	15 52.03	66.86	3 47.90	0.084
Mon.	12	3 15 42.08	9.796	18 6 46.4	37.84	15 51.82	66.95	3 49.64	0.060
Tues.	13	3 19 37.47	9.821	18 21 45.7	37.08	15 51.61	67.03	3 50.80	0.035
Wed.	14	3 23 33.47	9.846	18 36 26.5	36.31	15 51.40	67.11	3 51.36	0.011
Thur.	15	3 27 30.07	9.871	18 50 48.5	35.52	15 51.20	67.19	3 51.32	0.014
Frid.	16	3 31 27.26	9.895	19 4 51.6	34.72	15 51.00	67.27	3 50.68	0.039
Sat.	17	3 35 25.03	9.919	19 18 35.5	33.91	15 50.80	67.35	3 49.47	0.062
Sun.	18	3 39 23.37	9.942	19 31 59.8	33.06	15 50.61	67.43	3 47.69	0.086
Mon.	19	3 43 22.28	9.966	19 45 4.0	32.26	15 50.42	67.51	3 45.84	0.109
Tues.	20	3 47 21.76	9.989	19 57 47.9	31.41	15 50.24	67.59	3 42.43	0.133
Wed.	21	3 51 21.79	10.012	20 10 11.5	30.56	15 50.06	67.67	3 38.97	0.156
Thur.	22	3 55 22.36	10.035	20 22 14.5	29.69	15 49.89	67.74	3 34.97	0.178
Frid.	23	3 59 23.44	10.057	20 33 56.7	28.81	15 49.72	67.82	3 30.46	0.199
Sat.	24	4 3 25.04	10.078	20 45 17.6	27.92	15 49.55	67.89	3 25.43	0.220
Sun.	25	4 7 27.14	10.098	20 56 17.0	27.02	15 49.39	67.96	3 19.90	0.240
Mon.	26	4 11 29.73	10.118	21 6 54.8	26.12	15 49.23	68.03	3 13.89	0.260
Tues.	27	4 15 32.79	10.137	21 17 10.8	25.20	15 49.08	68.10	3 7.41	0.278
Wed.	28	4 19 36.30	10.156	21 27 4.7	24.28	15 48.93	68.17	3 0.48	0.297
Thur.	29	4 23 40.26	10.174	21 36 36.3	23.34	15 48.79	68.23	2 53.10	0.315
Frid.	30	4 27 44.65	10.191	21 45 45.5	22.40	15 48.65	68.29	2 45.28	0.334
Sat.	31	4 31 49.46	10.208	21 54 32.1	21.45	15 48.51	68.35	2 37.05	0.351
Sun.	32	4 35 54.68	10.225	N. 22 2 55.9	+20.50	15 48.38	68.41	2 28.42	0.368

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sideral Time.  
+ prefixed to the hourly change of declination indicates that north declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup> <sup>a</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Thur.	1	2 33 11.42	9.537	N.15 3 4.5	+45.42	2 58.82	0.318	2 36 10.24
Frid.	2	2 37 05.59	9.560	15 21 7.2	44.79	3 6.20	0.296	2 40 6.79
Sat.	3	2 40 50.29	9.582	15 38 54.6	44.15	3 13.06	0.274	2 44 3.35
Sun.	4	2 44 40.51	9.604	15 56 26.6	43.51	3 19.40	0.252	2 47 59.91
Mon.	5	2 48 31.28	9.627	16 13 42.9	42.86	3 25.19	0.229	2 51 56.47
Tues.	6	2 52 22.61	9.651	16 30 42.9	42.17	3 30.41	0.206	2 55 53.02
Wed.	7	2 56 14.50	9.675	16 47 26.6	41.47	3 35.08	0.183	2 59 49.58
Thur.	8	3 0 6.96	9.699	17 3 53.5	40.77	3 39.17	0.159	3 3 46.13
Frid.	9	3 4 0.01	9.723	17 20 3.5	40.06	3 42.68	0.134	3 7 42.69
Sat.	10	3 7 53.65	9.747	17 35 56.3	39.33	3 45.59	0.109	3 11 39.24
Sun.	11	3 11 47.89	9.771	17 51 31.6	38.59	3 47.91	0.084	3 15 35.80
Mon.	12	3 15 42.71	9.796	18 6 48.9	37.84	3 49.64	0.060	3 19 32.35
Tues.	13	3 19 38.11	9.821	18 21 48.1	37.08	3 50.80	0.035	3 23 28.91
Wed.	14	3 23 34.11	9.846	18 36 28.8	36.31	3 51.36	0.011	3 27 25.47
Thur.	15	3 27 30.71	9.871	18 50 50.8	35.52	3 51.32	0.014	3 31 22.03
Frid.	16	3 31 27.90	9.895	19 4 53.8	34.72	3 50.68	0.039	3 35 18.58
Sat.	17	3 35 25.67	9.919	19 18 37.6	33.91	3 49.47	0.062	3 39 15.14
Sun.	18	3 39 24.01	9.942	19 32 1.8	33.09	3 47.68	0.086	3 43 11.69
Mon.	19	3 43 22.92	9.966	19 45 6.0	32.26	3 45.33	0.109	3 47 8.25
Tues.	20	3 47 22.39	9.989	19 57 49.9	31.41	3 42.42	0.133	3 51 4.81
Wed.	21	3 51 22.41	10.012	20 10 13.4	30.56	3 38.96	0.156	3 55 1.37
Thur.	22	3 55 22.96	10.034	20 22 16.3	29.69	3 34.96	0.178	3 58 57.92
Frid.	23	3 59 24.03	10.056	20 33 58.4	28.81	3 30.45	0.199	4 2 54.48
Sat.	24	4 3 25.62	10.077	20 45 19.2	27.92	3 25.42	0.220	4 6 51.04
Sun.	25	4 7 27.71	10.097	20 56 18.5	27.02	3 19.89	0.240	4 10 47.60
Mon.	26	4 11 30.28	10.117	21 6 56.2	26.12	3 13.87	0.260	4 14 44.15
Tues.	27	4 15 33.32	10.136	21 17 56.1	25.20	3 7.39	0.278	4 18 40.71
Wed.	28	4 19 36.81	10.155	21 27 5.9	24.28	3 0.46	0.297	4 22 37.27
Thur.	29	4 23 40.75	10.173	21 36 37.4	23.34	2 53.08	0.315	4 26 33.83
Frid.	30	4 27 45.12	10.190	21 45 46.5	22.40	2 45.26	0.334	4 30 30.38
Sat.	31	4 31 49.91	10.207	21 54 33.0	21.45	2 37.03	0.351	4 34 26.94
Sun.	32	4 35 55.10	10.224	N.22 2 56.6	+20.50	2 28.40	0.368	4 38 23.50

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

+ prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 hour.  
+ 9<sup>s</sup>.8565  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal $^{\circ}$ .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	121	40° 43' 41".2	43° 10' 8"	145.43	—0.37	0.0034993	+43.9	<sup>h</sup> 21 <sup>m</sup> 20 <sup>s</sup> 19.44	
2	122	41 41 50.5	41 20.0	145.35	0.46	.0036044	43.6	21 16 23.53	
3	123	42 39 57.9	39 27.3	145.27	0.52	.0037088	43.3	21 12 27.62	
4	124	43 38 3.4	37 32.7	145.19	0.54	.0038126	43.1	21 8 31.71	
5	125	44 36 7.3	35 36.3	145.12	0.53	.0039158	42.8	21 4 35.80	
6	126	45 34 9.4	33 38.3	145.05	0.49	.0040184	42.6	21 0 39.89	
7	127	46 32 9.8	31 38.6	144.98	0.43	.0041204	42.3	20 56 43.98	
8	128	47 30 8.7	29 37.4	144.92	0.36	.0042217	42.0	20 52 48.07	
9	129	48 28 6.1	27 34.6	144.86	0.24	.0043223	41.7	20 48 52.16	
10	130	49 26 2.1	25 30.4	144.81	—0.11	.0044220	41.3	20 44 56.25	
11	131	50 23 56.8	23 25.0	144.75	+0.04	.0045208	40.9	20 41 0.34	
12	132	51 21 50.3	21 18.4	144.70	0.18	.0046185	40.4	20 37 4.43	
13	133	52 19 42.5	19 10.4	144.65	0.31	.0047150	39.9	20 33 8.52	
14	134	53 17 33.5	17 1.2	144.60	0.44	.0048101	39.3	20 29 12.61	
15	135	54 15 23.4	14 50.9	144.55	0.54	.0049037	38.6	20 25 16.70	
16	136	55 13 12.0	12 39.4	144.50	0.63	.0049957	37.9	20 21 20.79	
17	137	56 10 59.4	10 26.7	144.45	0.69	.0050858	37.1	20 17 24.88	
18	138	57 8 45.6	8 12.7	144.40	0.71	.0051740	36.3	20 13 28.97	
19	139	58 6 30.7	5 57.6	144.35	0.72	.0052603	35.4	20 9 33.05	
20	140	59 4 14.5	3 41.2	144.30	0.69	.0053444	34.5	20 5 37.14	
21	141	60 1 57.0	1 23.6	144.24	0.61	.0054263	33.5	20 1 41.23	
22	142	60 59 38.1	59 4.6	144.18	0.52	.0055061	32.6	19 57 45.32	
23	143	61 57 17.9	56 44.2	144.12	0.42	.0055837	31.7	19 53 49.41	
24	144	62 54 56.3	54 22.4	144.07	0.30	.0056591	30.9	19 49 53.50	
25	145	63 52 33.3	51 59.2	144.01	0.17	.0057322	30.0	19 45 57.59	
26	146	64 50 8.9	49 34.7	143.95	+0.04	.0058033	29.2	19 42 1.68	
27	147	65 47 43.1	47 8.8	143.89	—0.09	.0058726	28.4	19 38 5.76	
28	148	66 45 15.9	44 41.4	143.84	0.20	.0059400	27.7	19 34 9.85	
29	149	67 42 47.3	42 12.5	143.78	0.27	.0060057	27.0	19 30 13.94	
30	150	68 40 17.3	39 42.3	143.73	0.33	.0060698	26.4	19 26 18.03	
31	151	69 37 46.1	37 10.9	143.68	0.35	.0061324	25.8	19 22 22.11	
32	152	70 35 13.7	34 38.4	143.63	—0.35	0.0061936	+25.2	19 18 26.20	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .									Diff. for 1 hour. —9 <sup>h</sup> .8396 (Table II.)

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>d</sup>	
1	16' 4.2	16' 11.5	58' 51.7	+2.29	59' 18.9	+2.23	8 1.0	2.03	9.9	
2	16 18.7	16 25.3	59 45.1	2.11	60 9.5	1.93	8 50.3	2.09	10.9	
3	16 31.3	16 36.5	60 31.5	1.71	60 50.5	1.43	9 41.5	2.20	11.9	
4	16 40.7	16 43.7	61 5.8	1.19	61 16.7	+0.71	10 35.9	2.35	12.9	
5	16 45.3	16 45.6	61 22.8	+0.31	61 24.0	-0.11	11 34.4	2.53	13.9	
6	16 44.6	16 42.1	61 20.1	-0.53	61 11.3	0.93	12 36.6	2.66	14.9	
7	16 38.5	16 33.7	60 57.8	1.29	60 40.2	1.62	13 41.2	2.69	15.9	
8	16 27.9	16 21.3	60 18.9	1.89	59 54.6	2.12	14 45.3	2.62	16.9	
9	16 14.1	16 6.4	59 28.1	2.28	59 0.0	2.38	15 46.1	2.43	17.9	
10	15 58.6	15 50.6	58 31.1	2.42	58 2.0	2.41	16 42.1	2.22	18.9	
11	15 42.8	15 35.1	57 33.2	2.36	57 5.3	2.27	17 32.9	2.01	19.9	
12	15 28.0	15 21.2	56 38.8	2.14	56 13.9	2.00	18 19.3	1.85	20.9	
13	15 14.9	15 9.2	55 50.8	1.84	55 29.8	1.66	19 2.4	1.74	21.9	
14	15 4.0	14 59.4	55 10.9	1.48	54 54.3	1.30	19 43.6	1.69	22.9	
15	14 55.6	14 52.2	54 39.8	1.11	54 27.6	0.92	20 23.9	1.68	23.9	
16	14 49.5	14 47.3	54 17.5	0.74	54 9.6	0.57	21 4.4	1.71	24.9	
17	14 45.8	14 44.7	54 3.7	0.41	53 59.7	-0.25	21 46.2	1.78	25.9	
18	14 44.0	14 43.9	53 57.5	-0.10	53 57.1	+0.04	22 29.9	1.87	26.9	
19	14 44.2	14 44.9	53 58.3	+0.16	54 0.9	0.28	23 16.1	1.98	27.9	
20	14 46.0	14 47.5	54 4.9	0.39	54 10.2	0.49	δ		28.9	
21	14 49.3	14 51.4	54 16.7	0.59	54 24.4	0.69	0 4.9	2.08	0.3	
22	14 53.8	14 56.5	54 33.2	0.78	54 43.1	0.88	0 55.7	2.15	1.3	
23	14 59.4	15 2.8	54 54.3	0.98	55 6.6	1.07	1 47.7	2.17	2.3	
24	15 6.5	15 10.5	55 20.1	1.17	55 34.7	1.27	2 39.7	2.15	3.3	
25	15 14.8	15 19.4	55 50.6	1.37	56 7.6	1.47	3 30.7	2.09	4.3	
26	15 24.4	15 29.7	56 25.8	1.57	56 45.1	1.65	4 20.2	2.03	5.3	
27	15 35.2	15 41.0	57 5.4	1.73	57 26.7	1.81	5 8.2	1.97	6.3	
28	15 47.0	15 53.2	57 48.8	1.86	58 11.4	1.90	5 55.3	1.95	7.3	
29	15 59.4	16 5.6	58 34.3	1.90	58 57.1	1.88	6 42.5	1.98	8.3	
30	16 11.6	16 17.4	59 19.3	1.81	59 40.5	1.70	7 30.9	2.09	9.3	
31	16 22.8	16 27.5	60 0.1	1.55	60 17.6	1.35	8 22.0	2.20	10.3	
32	16 31.6	16 34.8	60 32.5	+1.11	60 44.2	+0.82	9 16.8	2.38	11.3	



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 1.					SATURDAY 3.				
0	10 21 28.29	2.1199	N. 7° 2' 29.6"	14.913	0	12 5 16.37	2.9357	S. 5° 39' 17.8"	15.008
1	10 23 35.46	2.1199	6 47 33.1	14.968	1	12 7 30.64	2.9401	5 49 17.8	15.992
2	10 25 42.68	2.1907	6 32 33.4	15.092	2	12 9 45.18	2.9445	6 5 16.8	15.973
3	10 27 49.94	2.1914	6 17 30.5	15.075	3	12 11 59.98	2.9490	6 21 14.6	15.953
4	10 29 57.25	2.1923	6 2 24.4	15.197	4	12 14 15.06	2.9536	6 37 11.1	15.931
5	10 32 4.62	2.1939	5 47 15.3	15.177	5	12 16 30.41	2.9589	6 53 6.3	15.908
6	10 34 12.04	2.1949	5 32 3.2	15.296	6	12 18 46.04	2.9698	7 9 0.0	15.889
7	10 36 19.52	2.1952	5 16 48.2	15.374	7	12 21 1.95	2.9777	7 24 52.1	15.853
8	10 38 27.07	2.1964	5 1 30.3	15.391	8	12 23 18.16	2.9796	7 40 42.4	15.893
9	10 40 34.69	2.1976	4 46 9.7	15.360	9	12 25 34.66	2.9775	7 56 30.9	15.799
10	10 42 42.38	2.1989	4 30 46.4	15.411	10	12 27 51.46	2.9895	8 12 17.4	15.758
11	10 44 50.16	2.1303	4 15 20.4	15.454	11	12 30 8.56	2.9875	8 28 1.9	15.793
12	10 46 58.02	2.1317	3 59 51.9	15.495	12	12 32 25.96	2.9996	8 43 44.2	15.685
13	10 49 5.97	2.1339	3 44 21.0	15.535	13	12 34 43.67	2.9978	8 59 24.1	15.645
14	10 51 14.01	2.1348	3 28 47.7	15.574	14	12 37 1.70	2.9309	9 15 1.6	15.604
15	10 53 22.15	2.1365	3 13 12.1	15.619	15	12 39 20.05	2.9365	9 30 36.6	15.581
16	10 55 30.39	2.1383	2 57 34.3	15.648	16	12 41 38.72	2.9138	9 46 8.9	15.515
17	10 57 38.74	2.1401	2 41 54.3	15.683	17	12 43 57.71	2.9198	10 1 38.4	15.467
18	10 59 47.20	2.1490	2 26 12.3	15.717	18	12 46 17.03	2.9947	10 17 4.9	15.416
19	11 1 55.78	2.1440	2 10 28.3	15.749	19	12 48 36.08	2.9303	10 32 28.3	15.364
20	11 4 4.48	2.1460	1 54 42.4	15.779	20	12 50 56.67	2.9380	10 47 48.6	15.311
21	11 6 13.30	2.1481	1 38 54.8	15.806	21	12 53 17.00	2.9417	11 3 5.6	15.355
22	11 8 22.25	2.1503	1 23 5.5	15.836	22	12 55 37.67	2.9474	11 18 19.2	15.197
23	11 10 31.34	2.1597	N. 1° 7' 14.5"	15.869	23	12 57 58.69	2.9539	S. 11° 33' 29.2"	15.136
FRIDAY 2.					SUNDAY 4.				
0	11 12 40.57	2.1550	N. 0° 51' 22.0"	15.887	0	13 0 20.06	2.9391	S. 11° 48' 35.5"	15.073
1	11 14 49.94	2.1574	0 35 28.0	15.911	1	13 2 41.78	2.9649	12 3 38.0	15.009
2	11 16 59.46	2.1600	0 19 32.7	15.939	2	13 5 3.85	2.9708	12 18 36.6	14.949
3	11 19 9.14	2.1697	N. 0° 3' 36.1"	15.953	3	13 7 26.28	2.9768	12 33 31.1	14.873
4	11 21 18.98	2.1653	S. 0° 12' 21.7"	15.972	4	13 9 49.07	2.9899	12 48 21.4	14.802
5	11 23 28.98	2.1680	0 28 20.6	15.990	5	13 12 12.23	2.9890	13 3 7.4	14.789
6	11 25 39.14	2.1708	0 44 20.5	16.006	6	13 14 35.75	2.9951	13 17 48.9	14.653
7	11 27 49.48	2.1738	1 0 21.3	16.090	7	13 16 59.64	2.4013	13 32 25.8	14.576
8	11 30 0.00	2.1768	1 16 22.9	16.039	8	13 19 23.90	2.4075	13 46 58.0	14.497
9	11 32 10.70	2.1799	1 32 25.2	16.043	9	13 21 48.54	2.4137	14 1 25.4	14.415
10	11 34 21.59	2.1831	1 48 28.1	16.053	10	13 24 13.55	2.4199	14 15 47.8	14.331
11	11 36 32.67	2.1863	2 4 31.5	16.061	11	13 26 38.93	2.4269	14 30 5.1	14.944
12	11 38 43.94	2.1896	2 20 35.4	16.067	12	13 29 4.69	2.4325	14 44 17.1	14.156
13	11 40 55.42	2.1931	2 36 39.6	16.079	13	13 31 30.83	2.4388	14 58 23.8	14.066
14	11 43 7.11	2.1965	2 52 44.0	16.075	14	13 33 57.35	2.4452	15 12 25.0	13.973
15	11 45 19.00	2.9000	3 8 48.6	16.076	15	13 36 24.26	2.4517	15 26 20.5	13.878
16	11 47 31.11	2.9037	3 24 53.1	16.075	16	13 38 51.55	2.4580	15 40 10.3	13.780
17	11 49 43.45	2.9075	3 40 57.6	16.073	17	13 41 19.22	2.4644	15 53 54.1	13.680
18	11 51 56.01	2.9113	3 57 1.9	16.069	18	13 43 47.28	2.4708	16 7 31.9	13.579
19	11 54 8.80	2.9159	4 13 5.9	16.063	19	13 46 15.72	2.4779	16 21 3.6	13.475
20	11 56 21.83	2.9191	4 29 9.5	16.056	20	13 48 44.55	2.4837	16 34 28.9	13.368
21	11 58 35.09	2.9231	4 45 12.6	16.047	21	13 51 13.77	2.4909	16 47 47.8	13.261
22	12 0 48.00	2.9279	5 1 15.1	16.036	22	13 53 43.37	2.4986	17 1 0.2	13.151
23	12 3 2.36	2.9314	5 17 16.9	16.093	23	13 56 13.36	2.5031	17 14 5.9	13.038
24	12 5 16.37	2.9357	S. 5° 33' 17.8"	16.008	24	13 58 43.74	2.5095	S. 17° 27' 4.8"	12.993



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 9.					SUNDAY 11.				
0	18 15 55.16	2.6207	S. 25° 26' 22.9"	3.863	0	20 13 3.32	2.9488	S. 19° 35' 15.1"	10.192
1	18 18 32.21	2.6143	25 22 26.0	4.039	1	20 15 17.97	2.9402	19 25 5.1	10.211
2	18 21 8.87	2.6078	25 18 19.0	4.200	2	20 17 32.15	2.9324	19 14 49.8	10.299
3	18 23 45.14	2.6012	25 14 2.0	4.366	3	20 19 45.86	2.9247	19 4 29.2	10.386
4	18 26 21.01	2.5944	25 9 35.1	4.530	4	20 21 59.11	2.9169	18 54 3.5	10.470
5	18 28 56.47	2.5876	25 4 58.4	4.693	5	20 24 11.89	2.9092	18 43 32.8	10.552
6	18 31 31.52	2.5807	25 0 12.0	4.854	6	20 26 24.21	2.9015	18 32 57.2	10.634
7	18 34 6.15	2.5737	24 55 15.9	5.014	7	20 28 36.07	2.8939	18 22 16.7	10.715
8	18 36 40.36	2.5665	24 50 10.3	5.179	8	20 30 47.48	2.8863	18 11 31.4	10.793
9	18 39 14.13	2.5592	24 44 55.3	5.338	9	20 32 58.43	2.8787	18 0 41.5	10.870
10	18 41 47.46	2.5519	24 39 30.9	5.493	10	20 35 8.93	2.8713	17 49 47.0	10.947
11	18 44 20.36	2.5446	24 33 57.3	5.636	11	20 37 18.99	2.8640	17 38 47.9	11.022
12	18 46 52.81	2.5371	24 28 14.6	5.788	12	20 39 28.61	2.8566	17 27 44.4	11.094
13	18 49 24.81	2.5296	24 22 22.8	5.938	13	20 41 37.78	2.8493	17 16 36.6	11.165
14	18 51 56.36	2.5220	24 16 22.0	6.087	14	20 43 46.52	2.8421	17 5 24.6	11.235
15	18 54 27.45	2.5143	24 10 12.4	6.233	15	20 45 54.83	2.8349	16 54 8.4	11.303
16	18 56 58.08	2.5066	24 3 54.0	6.379	16	20 48 2.71	2.8278	16 42 48.2	11.370
17	18 59 28.24	2.4988	23 57 26.9	6.522	17	20 50 10.17	2.8207	16 31 24.0	11.437
18	19 1 57.94	2.4911	23 50 51.3	6.664	18	20 52 17.20	2.8137	16 19 55.8	11.502
19	19 4 27.17	2.4833	23 44 7.2	6.804	19	20 54 23.81	2.8068	16 8 23.7	11.565
20	19 6 55.92	2.4759	23 37 14.8	6.949	20	20 56 30.02	2.8001	15 56 48.0	11.625
21	19 9 24.19	2.4673	23 30 14.1	7.079	21	20 58 35.82	2.0933	15 45 8.7	11.685
22	19 11 51.99	2.4583	23 23 5.3	7.213	22	21 0 41.21	2.0865	15 33 25.8	11.745
23	19 14 19.31	2.4512	S. 23 15 48.5	7.347	23	21 2 46.20	2.0798	S. 15 21 39.3	11.803
SATURDAY 10.					MONDAY 12.				
0	19 16 46.14	2.4439	S. 23 8 23.7	7.478	0	21 4 50.79	2.0732	S. 15 9 49.4	11.859
1	19 19 12.49	2.4351	23 0 51.1	7.608	1	21 6 54.99	2.0667	14 57 56.2	11.914
2	19 21 38.35	2.4269	22 53 10.8	7.736	2	21 8 58.80	2.0603	14 45 59.7	11.968
3	19 24 3.72	2.4187	22 45 22.8	7.863	3	21 11 2.23	2.0540	14 34 0.0	12.021
4	19 26 28.60	2.4106	22 37 27.2	7.987	4	21 13 5.28	2.0477	14 21 57.2	12.073
5	19 28 52.99	2.4025	22 29 24.3	8.109	5	21 15 7.95	2.0414	14 9 51.3	12.123
6	19 31 16.90	2.3943	22 21 14.1	8.230	6	21 17 10.25	2.0352	13 57 42.4	12.172
7	19 33 40.31	2.3861	22 12 56.7	8.350	7	21 19 12.18	2.0289	13 45 30.6	12.220
8	19 36 3.23	2.3779	22 4 32.1	8.468	8	21 21 13.75	2.0228	13 33 16.0	12.266
9	19 38 25.66	2.3697	21 56 0.5	8.584	9	21 23 14.96	2.0173	13 20 58.7	12.311
10	19 40 47.59	2.3614	21 47 22.0	8.698	10	21 25 15.82	2.0114	13 8 38.7	12.356
11	19 43 9.03	2.3532	21 38 36.7	8.810	11	21 27 16.33	2.0057	12 56 16.0	12.400
12	19 45 29.98	2.3451	21 29 44.8	8.920	12	21 29 16.50	2.0000	12 43 50.7	12.442
13	19 47 50.44	2.3369	21 20 46.3	9.029	13	21 31 16.33	1.9943	12 31 23.0	12.482
14	19 50 10.41	2.3287	21 11 41.3	9.137	14	21 33 15.82	1.9887	12 18 52.9	12.522
15	19 52 29.88	2.3204	21 2 29.8	9.244	15	21 35 14.98	1.9832	12 6 20.4	12.561
16	19 54 48.86	2.3123	20 53 12.0	9.348	16	21 37 13.81	1.9779	11 53 45.6	12.598
17	19 57 7.36	2.3043	20 43 48.0	9.450	17	21 39 12.33	1.9727	11 41 8.6	12.634
18	19 59 25.38	2.2962	20 34 18.0	9.550	18	21 41 10.53	1.9674	11 28 29.5	12.670
19	20 1 42.91	2.2881	20 24 42.0	9.650	19	21 43 8.42	1.9622	11 15 48.2	12.705
20	20 3 59.95	2.2800	20 15 0.0	9.748	20	21 45 6.00	1.9572	11 3 4.9	12.737
21	20 6 16.51	2.2720	20 5 12.2	9.843	21	21 47 3.28	1.9522	10 50 19.7	12.769
22	20 8 32.59	2.2640	19 55 18.8	9.938	22	21 49 0.26	1.9472	10 37 32.6	12.801
23	20 10 48.19	2.2561	19 45 19.7	10.031	23	21 50 56.95	1.9424	10 24 43.6	12.832
24	20 13 3.32	2.2482	S. 19 35 15.1	10.123	24	21 52 53.35	1.9377	S. 10 11 52.8	12.861

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 13.					THURSDAY 15.				
0	21 52 53.35	1.9377	S. 10° 11' 52.8"	12.881	0	23 21 55.64	1.8090	N. 0° 22' 23.5"	13.963
1	21 54 49.47	1.9330	9 59 0.3	12.889	1	23 23 43.73	1.8011	0 35 39.0	13.953
2	21 56 45.31	1.9284	9 46 6.1	12.917	2	23 25 31.77	1.8002	0 48 53.8	13.949
3	21 58 40.88	1.9239	9 33 10.3	12.943	3	23 27 19.76	1.7994	1 2 8.0	13.931
4	22 0 36.18	1.9195	9 20 12.9	12.968	4	23 29 7.70	1.7987	1 15 21.5	13.918
5	22 2 31.22	1.9151	9 7 14.1	12.992	5	23 30 55.60	1.7980	1 28 34.2	13.906
6	22 4 25.99	1.9108	8 54 13.9	13.015	6	23 32 43.46	1.7974	1 41 46.2	13.193
7	22 6 20.51	1.9067	8 41 12.3	13.038	7	23 34 31.29	1.7969	1 54 57.4	13.179
8	22 8 14.79	1.9026	8 28 9.3	13.061	8	23 36 19.09	1.7964	2 8 7.7	13.163
9	22 10 8.82	1.8985	8 15 5.0	13.089	9	23 38 6.86	1.7960	2 21 17.0	13.148
10	22 12 2.61	1.8946	8 1 59.5	13.101	10	23 39 54.61	1.7957	2 34 25.4	13.133
11	22 13 56.17	1.8907	7 48 52.9	13.119	11	23 41 42.34	1.7954	2 47 32.9	13.117
12	22 15 49.49	1.8868	7 35 45.2	13.137	12	23 43 30.06	1.7952	3 0 39.4	13.099
13	22 17 42.59	1.8829	7 22 36.4	13.155	13	23 45 17.77	1.7952	3 13 44.8	13.081
14	22 19 35.47	1.8790	7 9 26.6	13.173	14	23 47 5.48	1.7952	3 26 49.1	13.069
15	22 21 28.14	1.8760	6 56 15.8	13.187	15	23 48 53.19	1.7952	3 39 52.3	13.043
16	22 23 20.59	1.8725	6 43 4.1	13.202	16	23 50 40.90	1.7952	3 52 54.3	13.023
17	22 25 12.84	1.8691	6 29 51.6	13.215	17	23 52 28.61	1.7953	4 5 55.1	13.008
18	22 27 4.88	1.8657	6 16 38.3	13.227	18	23 54 16.33	1.7955	4 18 54.6	12.991
19	22 28 56.73	1.8625	6 3 24.3	13.240	19	23 56 4.07	1.7958	4 31 52.8	12.969
20	22 30 48.38	1.8593	5 50 9.5	13.259	20	23 57 51.83	1.7962	4 44 49.7	12.937
21	22 32 39.85	1.8563	5 36 54.0	13.263	21	23 59 39.62	1.7967	4 57 45.2	12.913
22	22 34 31.14	1.8533	5 23 37.9	13.273	22	0 1 27.43	1.7973	5 10 39.3	12.889
23	22 36 22.25	1.8503	S. 5 10 21.3	13.289	23	0 3 15.28	1.7977	N. 5 23 31.9	12.864
WEDNESDAY 14.					FRIDAY 16.				
0	22 38 13.18	1.8474	S. 4 57 4.1	13.290	0	0 5 3.16	1.7983	N. 5 36 23.0	12.839
1	22 40 3.94	1.8447	4 43 46.5	13.297	1	0 6 51.08	1.7990	5 49 12.6	12.813
2	22 41 54.54	1.8421	4 30 28.5	13.303	2	0 8 39.04	1.7998	6 2 0.6	12.787
3	22 43 44.99	1.8395	4 17 10.1	13.309	3	0 10 27.05	1.8006	6 14 47.0	12.760
4	22 45 35.28	1.8369	4 3 51.4	13.314	4	0 12 15.11	1.8015	6 27 31.8	12.732
5	22 47 25.42	1.8344	3 50 32.4	13.319	5	0 14 3.23	1.8024	6 40 14.8	12.703
6	22 49 15.41	1.8320	3 37 13.1	13.322	6	0 15 51.40	1.8033	6 52 56.1	12.673
7	22 51 5.26	1.8298	3 23 53.7	13.325	7	0 17 39.63	1.8044	7 5 35.6	12.643
8	22 52 54.98	1.8276	3 10 34.1	13.327	8	0 19 27.93	1.8057	7 18 13.3	12.613
9	22 54 44.57	1.8254	2 57 14.4	13.328	9	0 21 16.31	1.8069	7 30 49.2	12.582
10	22 56 34.03	1.8233	2 43 54.7	13.329	10	0 23 4.76	1.8081	7 43 23.2	12.550
11	22 58 23.36	1.8212	2 30 34.9	13.329	11	0 24 53.28	1.8093	7 55 55.2	12.517
12	23 0 12.57	1.8193	2 17 15.2	13.328	12	0 26 41.88	1.8107	8 8 25.2	12.483
13	23 2 1.67	1.8175	2 3 55.5	13.327	13	0 28 30.57	1.8122	8 20 53.2	12.449
14	23 3 50.67	1.8157	1 50 36.0	13.324	14	0 30 19.35	1.8137	8 33 19.1	12.415
15	23 5 39.56	1.8140	1 37 16.6	13.329	15	0 32 8.21	1.8152	8 45 43.0	12.380
16	23 7 28.35	1.8124	1 23 57.4	13.318	16	0 33 57.17	1.8168	8 58 4.7	12.344
17	23 9 17.05	1.8109	1 10 38.5	13.313	17	0 35 46.23	1.8186	9 10 24.2	12.308
18	23 11 5.66	1.8094	0 57 19.9	13.308	18	0 37 35.40	1.8203	9 22 41.6	12.271
19	23 12 54.18	1.8080	0 44 1.6	13.302	19	0 39 24.67	1.8221	9 34 56.7	12.239
20	23 14 42.62	1.8067	0 30 43.7	13.295	20	0 41 14.05	1.8239	9 47 9.4	12.193
21	23 16 30.98	1.8054	0 17 26.2	13.287	21	0 43 3.54	1.8258	9 59 19.8	12.153
22	23 18 19.27	1.8042	S. 0 4 9.2	13.280	22	0 44 53.14	1.8278	10 11 27.8	12.119
23	23 20 7.49	1.8031	N. 0 9 7.4	13.272	23	0 46 42.87	1.8298	10 23 33.3	12.079
24	23 21 55.64	1.8020	N. 0 22 23.5	13.263	24	0 48 32.72	1.8318	N. 10 35 36.4	12.031

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 17.					MONDAY 19.				
0	<sup>h</sup> 0 <sup>m</sup> 48 <sup>s</sup> 32.72	1.8318	N. 10° 35' 36.4"	12.831	0	<sup>h</sup> 2 <sup>m</sup> 19 <sup>s</sup> 47.00	1.9849	N. 19° 11' 6.6"	9.152
1	0 50 22.69	1.8340	10 47 37.0	11.988	1	2 21 46.21	1.9889	19 20 13.4	9.079
2	0 52 12.80	1.8362	10 59 35.0	11.945	2	2 23 45.67	1.9930	19 29 15.3	8.992
3	0 54 3.04	1.8384	11 11 30.4	11.902	3	2 25 45.37	1.9970	19 38 12.4	8.911
4	0 55 53.41	1.8407	11 23 23.2	11.857	4	2 27 45.31	2.0010	19 47 4.6	8.828
5	0 57 43.92	1.8431	11 35 13.3	11.812	5	2 29 45.49	2.0050	19 55 51.8	8.746
6	0 59 34.58	1.8455	11 47 0.6	11.766	6	2 31 45.91	2.0091	20 4 34.1	8.663
7	1 1 25.38	1.8479	11 58 45.2	11.720	7	2 33 46.58	2.0132	20 13 11.4	8.578
8	1 3 16.33	1.8504	12 10 27.0	11.673	8	2 35 47.49	2.0173	20 21 43.5	8.493
9	1 5 7.43	1.8530	12 22 5.9	11.624	9	2 37 48.65	2.0214	20 30 10.5	8.407
10	1 6 58.69	1.8557	12 33 41.9	11.575	10	2 39 50.06	2.0255	20 38 32.3	8.320
11	1 8 50.11	1.8583	12 45 14.9	11.526	11	2 41 1.71	2.0296	20 46 48.9	8.232
12	1 10 41.68	1.8609	12 56 45.0	11.477	12	2 43 53.61	2.0337	20 55 0.2	8.144
13	1 12 33.42	1.8637	13 8 12.1	11.425	13	2 45 55.76	2.0378	21 3 6.2	8.055
14	1 14 25.33	1.8665	13 19 36.0	11.372	14	2 47 58.15	2.0419	21 11 6.8	7.964
15	1 16 17.40	1.8693	13 30 56.8	11.320	15	2 50 0.79	2.0461	21 19 1.9	7.873
16	1 18 9.64	1.8722	13 42 14.4	11.267	16	2 52 3.68	2.0502	21 26 51.5	7.782
17	1 20 2.06	1.8752	13 53 28.8	11.213	17	2 54 6.81	2.0543	21 34 35.7	7.690
18	1 21 54.66	1.8782	14 4 40.0	11.159	18	2 56 10.19	2.0584	21 42 14.3	7.597
19	1 23 47.44	1.8812	14 15 47.9	11.103	19	2 58 13.82	2.0625	21 49 47.3	7.503
20	1 25 40.40	1.8842	14 26 52.4	11.047	20	3 0 17.69	2.0666	21 57 14.5	7.406
21	1 27 33.55	1.8873	14 37 53.5	10.990	21	3 2 21.81	2.0707	22 4 36.0	7.310
22	1 29 26.88	1.8905	14 48 51.2	10.932	22	3 4 26.18	2.0748	22 11 51.7	7.213
23	1 31 20.41	1.8937	N. 14 59 45.3	10.873	23	3 6 30.79	2.0789	N. 22 19 1.6	7.116
SUNDAY 18.					TUESDAY 20.				
0	1 33 14.13	1.8970	N. 15 10 35.9	10.814	0	3 8 35.65	2.0830	N. 22 26 5.7	7.018
1	1 35 8.05	1.9002	15 21 23.0	10.754	1	3 10 40.75	2.0870	22 33 3.8	6.918
2	1 37 2.16	1.9035	15 32 6.4	10.693	2	3 12 46.09	2.0911	22 39 55.9	6.819
3	1 38 56.47	1.9069	15 42 46.1	10.631	3	3 14 51.68	2.0952	22 46 42.1	6.719
4	1 40 50.99	1.9103	15 53 22.1	10.568	4	3 16 57.51	2.0992	22 53 22.2	6.617
5	1 42 45.71	1.9137	16 3 54.3	10.505	5	3 19 3.58	2.1031	22 59 56.2	6.515
6	1 44 40.64	1.9172	16 14 22.7	10.442	6	3 21 9.88	2.1070	23 6 24.0	6.412
7	1 46 35.78	1.9207	16 24 47.3	10.377	7	3 23 16.42	2.1110	23 12 45.6	6.308
8	1 48 31.13	1.9242	16 35 7.9	10.311	8	3 25 23.20	2.1150	23 19 0.9	6.203
9	1 50 26.69	1.9278	16 45 24.6	10.245	9	3 27 30.22	2.1189	23 25 10.0	6.098
10	1 52 22.47	1.9315	16 55 37.3	10.177	10	3 29 37.47	2.1227	23 31 12.7	5.992
11	1 54 18.47	1.9351	17 5 45.9	10.109	11	3 31 44.95	2.1266	23 37 9.0	5.885
12	1 56 14.68	1.9387	17 15 50.4	10.041	12	3 33 52.66	2.1304	23 42 58.9	5.777
13	1 58 11.11	1.9424	17 25 50.8	9.971	13	3 36 0.60	2.1342	23 48 42.3	5.669
14	2 0 7.77	1.9462	17 35 46.9	9.900	14	3 38 8.77	2.1380	23 54 19.2	5.560
15	2 2 4.66	1.9500	17 45 38.8	9.829	15	3 40 17.16	2.1417	23 59 49.5	5.450
16	2 4 1.77	1.9538	17 55 26.4	9.757	16	3 42 25.78	2.1455	24 5 13.2	5.340
17	2 5 59.11	1.9576	18 5 9.6	9.684	17	3 44 34.62	2.1492	24 10 30.3	5.229
18	2 7 56.68	1.9614	18 14 48.5	9.611	18	3 46 43.68	2.1529	24 15 40.7	5.117
19	2 9 54.48	1.9653	18 24 22.9	9.536	19	3 48 52.96	2.1564	24 20 44.3	5.004
20	2 11 52.51	1.9692	18 33 52.8	9.461	20	3 51 2.45	2.1599	24 25 41.1	4.891
21	2 13 50.78	1.9731	18 43 18.2	9.385	21	3 53 12.15	2.1634	24 30 31.2	4.777
22	2 15 49.28	1.9770	18 52 39.0	9.308	22	3 55 22.06	2.1669	24 35 14.4	4.663
23	2 17 48.02	1.9810	19 1 55.1	9.230	23	3 57 32.18	2.1703	24 39 50.7	4.547
24	2 19 47.00	1.9849	N. 19 11 6.6	9.152	24	3 59 42.50	2.1737	N. 24 44 20.0	4.430

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 21.					FRIDAY 23.				
0	3 59 42.50	2.1737	N.24 44' 20.0"	4.430	0	5 46 49.80	2.9632	N.25 53' 35.9"	1.680
1	4 1 53.02	2.1770	24 48 42.3	4.313	1	5 49 5.59	2.9633	25 51 51.1	1.812
2	4 4 3.74	2.1804	24 52 57.6	4.187	2	5 51 21.39	2.9633	25 49 58.4	1.945
3	4 6 14.67	2.1837	24 57 5.9	4.079	3	5 53 37.19	2.9632	25 47 57.7	2.078
4	4 8 25.79	2.1868	25 1 7.1	3.961	4	5 55 52.98	2.9631	25 45 49.0	2.212
5	4 10 37.09	2.1899	25 5 1.2	3.842	5	5 58 8.76	2.9628	25 43 32.3	2.344
6	4 12 48.58	2.1931	25 8 48.1	3.722	6	6 0 24.52	2.9626	25 41 7.7	2.477
7	4 15 0.26	2.1961	25 12 27.8	3.602	7	6 2 40.27	2.9623	25 38 35.1	2.609
8	4 17 12.11	2.1990	25 16 0.3	3.481	8	6 4 55.99	2.9618	25 35 54.6	2.742
9	4 19 24.14	2.2019	25 19 25.5	3.359	9	6 7 11.68	2.9613	25 33 6.1	2.874
10	4 21 36.34	2.2048	25 22 43.4	3.237	10	6 9 27.34	2.9607	25 30 9.7	3.006
11	4 23 48.72	2.2077	25 25 53.9	3.114	11	6 11 42.96	2.9601	25 27 5.4	3.137
12	4 26 1.27	2.2105	25 28 57.1	2.989	12	6 13 58.55	2.9594	25 23 53.2	3.269
13	4 28 13.98	2.2132	25 31 52.9	2.868	13	6 16 14.09	2.9586	25 20 33.1	3.401
14	4 30 26.85	2.2158	25 34 41.2	2.743	14	6 18 29.58	2.9577	25 17 5.1	3.532
15	4 32 39.87	2.2183	25 37 22.1	2.619	15	6 20 45.02	2.9568	25 13 29.2	3.664
16	4 34 53.04	2.2208	25 39 55.5	2.494	16	6 23 0.40	2.9558	25 9 45.4	3.795
17	4 37 6.36	2.2233	25 42 21.4	2.368	17	6 25 15.72	2.9548	25 5 53.8	3.925
18	4 39 19.83	2.2257	25 44 39.7	2.242	18	6 27 30.98	2.9537	25 1 54.4	4.055
19	4 41 33.44	2.2279	25 46 50.5	2.116	19	6 29 46.17	2.9526	24 57 47.2	4.185
20	4 43 47.18	2.2301	25 48 53.6	1.988	20	6 32 1.29	2.9513	24 53 32.2	4.315
21	4 46 1.05	2.2322	25 50 49.1	1.861	21	6 34 16.33	2.9501	24 49 9.4	4.445
22	4 48 15.05	2.2344	25 52 36.9	1.733	22	6 36 31.30	2.9487	24 44 38.8	4.574
23	4 50 29.18	2.2365	N.25 54' 17.1"	1.606	23	6 38 46.18	2.9473	N.24 40' 0.5"	4.702
THURSDAY 22.					SATURDAY 24.				
0	4 52 43.43	2.2384	N.25 55' 49.6"	1.477	0	6 41 0.98	2.9459	N.24 35' 14.5"	4.831
1	4 54 57.79	2.2402	25 57 14.4	1.348	1	6 43 15.69	2.9443	24 30 20.8	4.959
2	4 57 12.26	2.2421	25 58 31.4	1.219	2	6 45 30.30	2.9428	24 25 19.4	5.087
3	4 59 26.84	2.2439	25 59 40.7	1.090	3	6 47 44.82	2.9412	24 20 10.4	5.214
4	5 1 41.53	2.2456	26 0 42.2	0.960	4	6 49 59.24	2.9395	24 14 53.7	5.341
5	5 3 56.31	2.2471	26 1 35.9	0.829	5	6 52 13.56	2.9378	24 9 29.5	5.467
6	5 6 11.18	2.2486	26 2 21.7	0.698	6	6 54 27.78	2.9361	24 3 57.7	5.593
7	5 8 26.14	2.2501	26 2 59.7	0.568	7	6 56 41.89	2.9342	23 58 18.3	5.719
8	5 10 41.19	2.2515	26 3 29.9	0.437	8	6 58 55.89	2.9323	23 52 31.4	5.843
9	5 12 56.32	2.2528	26 3 52.2	0.306	9	7 1 9.77	2.9304	23 46 37.1	5.968
10	5 15 11.53	2.2541	26 4 6.6	0.174	10	7 3 23.54	2.9285	23 40 35.3	6.092
11	5 17 26.81	2.2552	26 4 13.1	+0.043	11	7 5 37.19	2.9264	23 34 26.1	6.216
12	5 19 42.15	2.2562	26 4 11.8	-0.088	12	7 7 50.71	2.9243	23 28 9.4	6.339
13	5 21 57.55	2.2572	26 4 2.6	0.290	13	7 10 4.11	2.9222	23 21 45.4	6.462
14	5 24 13.01	2.2582	26 3 45.4	0.353	14	7 12 17.39	2.9202	23 15 14.0	6.584
15	5 26 28.53	2.2591	26 3 20.2	0.486	15	7 14 30.54	2.9181	23 8 35.3	6.706
16	5 28 44.10	2.2598	26 2 47.1	0.618	16	7 16 43.56	2.9159	23 1 49.3	6.827
17	5 30 59.71	2.2604	26 2 6.1	0.750	17	7 18 56.45	2.9137	22 54 56.1	6.947
18	5 33 15.35	2.2610	26 1 17.1	0.882	18	7 21 9.21	2.9115	22 47 55.7	7.067
19	5 35 31.03	2.2616	26 0 30.2	1.015	19	7 23 21.83	2.9092	22 40 48.1	7.186
20	5 37 46.74	2.2621	25 59 15.3	1.148	20	7 25 34.31	2.9069	22 33 33.4	7.305
21	5 40 2.48	2.2625	25 58 2.4	1.282	21	7 27 46.66	2.9047	22 26 11.5	7.423
22	5 42 18.24	2.2628	25 56 41.5	1.414	22	7 29 58.87	2.9023	22 18 42.6	7.540
23	5 44 34.01	2.2630	25 55 12.7	1.547	23	7 32 10.93	2.1998	22 11 6.7	7.658
24	5 46 49.80	2.2632	N.25 53' 35.9"	1.680	24	7 34 22.85	2.1975	N.22 3' 23.7"	7.775

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 25.					TUESDAY 27.				
0	7 34 22.85	2.1975	N. 22° 3' 23.7"	7.775	0	9 17 2.12	2.0856	N. 13° 49' 54.4"	12.484
1	7 36 34.63	2.1981	21 55 33.7	7.891	1	9 19 7.20	2.0838	13 37 23.0	12.569
2	7 38 46.26	2.1996	21 47 36.8	8.005	2	9 21 12.18	2.0892	13 24 46.9	12.639
3	7 40 57.74	2.1901	21 39 33.1	8.118	3	9 23 17.07	2.0807	13 12 6.3	12.715
4	7 43 9.07	2.1876	21 31 22.6	8.239	4	9 25 21.86	2.0791	12 59 21.1	12.791
5	7 45 20.25	2.1853	21 23 5.3	8.345	5	9 27 26.56	2.0777	12 46 31.4	12.865
6	7 47 31.29	2.1897	21 14 41.2	8.457	6	9 29 31.18	2.0769	12 33 37.3	12.937
7	7 49 42.18	2.1802	21 6 10.4	8.569	7	9 31 35.71	2.0748	12 20 38.9	13.010
8	7 51 52.91	2.1776	20 57 32.9	8.681	8	9 33 40.16	2.0734	12 7 36.1	13.082
9	7 54 3.49	2.1751	20 48 48.7	8.792	9	9 35 44.52	2.0721	11 54 29.0	13.153
10	7 56 13.92	2.1726	20 39 57.9	8.901	10	9 37 48.81	2.0709	11 41 17.7	13.223
11	7 58 24.20	2.1700	20 31 0.6	9.009	11	9 39 53.03	2.0698	11 28 2.3	13.291
12	8 0 34.32	2.1674	20 21 56.8	9.117	12	9 41 57.18	2.0687	11 14 42.8	13.358
13	8 2 44.29	2.1649	20 12 46.5	9.225	13	9 44 1.27	2.0676	11 1 19.3	13.425
14	8 4 54.11	2.1623	20 3 20.8	9.332	14	9 46 5.29	2.0665	10 47 51.8	13.491
15	8 7 3.77	2.1597	19 54 6.7	9.438	15	9 48 9.25	2.0656	10 34 20.4	13.556
16	8 9 13.28	2.1572	19 44 37.2	9.543	16	9 50 13.16	2.0647	10 20 45.1	13.620
17	8 11 22.64	2.1547	19 35 1.5	9.648	17	9 52 17.02	2.0638	10 7 6.0	13.682
18	8 13 31.85	2.1522	19 25 19.5	9.752	18	9 54 20.82	2.0630	9 53 23.2	13.744
19	8 15 40.91	2.1497	19 15 31.3	9.854	19	9 56 24.58	2.0624	9 39 36.7	13.806
20	8 17 49.81	2.1471	19 5 37.0	9.956	20	9 58 28.31	2.0618	9 25 46.5	13.868
21	8 19 58.56	2.1446	18 55 36.6	10.057	21	10 0 32.00	2.0612	9 11 52.8	13.924
22	8 22 7.16	2.1421	18 45 30.1	10.158	22	10 2 35.66	2.0607	8 57 55.6	13.982
23	8 24 15.61	2.1397	N. 18 35 17.6	10.258	23	10 4 39.29	2.0602	N. 8 43 54.9	14.040
MONDAY 26.					WEDNESDAY 28.				
0	8 26 23.92	2.1373	N. 18 24 59.1	10.357	0	10 6 42.89	2.0598	N. 8 29 50.8	14.096
1	8 28 32.08	2.1347	18 14 34.7	10.455	1	10 8 46.47	2.0596	8 15 43.4	14.151
2	8 30 40.09	2.1322	18 4 4.5	10.553	2	10 10 50.04	2.0594	8 1 32.7	14.205
3	8 32 47.95	2.1298	17 53 28.4	10.650	3	10 12 53.60	2.0592	7 47 18.8	14.257
4	8 34 55.67	2.1274	17 42 46.5	10.746	4	10 14 57.15	2.0591	7 33 1.8	14.309
5	8 37 3.24	2.1250	17 31 58.9	10.840	5	10 17 0.69	2.0590	7 18 41.7	14.361
6	8 39 10.67	2.1227	17 21 5.7	10.934	6	10 19 4.23	2.0591	7 4 18.5	14.411
7	8 41 17.96	2.1203	17 10 6.8	11.028	7	10 21 7.78	2.0592	6 49 52.4	14.459
8	8 43 25.11	2.1181	16 59 2.3	11.120	8	10 23 11.34	2.0593	6 35 23.4	14.507
9	8 45 32.13	2.1158	16 47 52.4	11.211	9	10 25 14.90	2.0595	6 20 51.5	14.555
10	8 47 39.01	2.1135	16 36 37.0	11.302	10	10 27 18.48	2.0599	6 6 16.8	14.600
11	8 49 45.75	2.1113	16 25 16.1	11.392	11	10 29 22.09	2.0603	5 51 39.5	14.644
12	8 51 52.36	2.1091	16 13 49.9	11.481	12	10 31 25.72	2.0607	5 36 59.5	14.686
13	8 53 58.64	2.1069	16 2 18.4	11.570	13	10 33 29.38	2.0613	5 22 16.9	14.731
14	8 56 5.19	2.1048	15 50 41.5	11.658	14	10 35 33.08	2.0619	5 7 31.8	14.772
15	8 58 11.42	2.1027	15 38 59.4	11.745	15	10 37 36.81	2.0626	4 52 44.2	14.813
16	9 0 17.52	2.1007	15 27 12.1	11.830	16	10 39 40.59	2.0634	4 37 54.2	14.852
17	9 2 23.50	2.0987	15 15 19.8	11.914	17	10 41 44.42	2.0643	4 23 2.0	14.889
18	9 4 29.36	2.0967	15 3 22.4	11.998	18	10 43 48.31	2.0652	4 8 7.5	14.927
19	9 6 35.10	2.0947	14 51 20.0	12.082	19	10 45 52.25	2.0662	3 53 10.8	14.963
20	9 8 40.73	2.0928	14 39 12.6	12.164	20	10 47 56.26	2.0673	3 38 12.0	14.998
21	9 10 46.24	2.0909	14 27 0.3	12.246	21	10 50 0.33	2.0684	3 23 11.1	15.032
22	9 12 51.64	2.0891	14 14 43.1	12.327	22	10 52 4.47	2.0697	3 8 8.2	15.063
23	9 14 56.93	2.0873	14 2 21.1	12.406	23	10 54 8.69	2.0711	2 53 3.5	15.093
24	9 17 2.12	2.0856	N. 13 49 54.4	12.484	24	10 56 13.00	2.0725	N. 2 37 57.0	15.123

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 29.					SATURDAY 31.				
0	10 56 13.00	2.0725	N. 2 37 57.0	15.123	0	12 38 53.35	2.2377	S. 9 37 55.4	14.960
1	10 58 17.39	2.0739	2 22 48.7	15.153	1	12 41 7.77	2.2431	9 52 53.0	14.939
2	11 0 21.87	2.0755	2 7 38.6	15.182	2	12 43 22.52	2.2486	10 7 48.1	14.896
3	11 2 26.45	2.0772	1 52 26.9	15.208	3	12 45 37.60	2.2541	10 22 40.5	14.851
4	11 4 31.13	2.0789	1 37 13.7	15.233	4	12 47 53.01	2.2598	10 37 30.2	14.804
5	11 6 35.92	2.0807	1 21 59.0	15.257	5	12 50 8.77	2.2655	10 52 17.0	14.756
6	11 8 40.81	2.0825	1 6 42.9	15.279	6	12 52 24.87	2.2712	11 7 0.9	14.706
7	11 10 45.82	2.0845	0 51 25.5	15.301	7	12 54 41.32	2.2771	11 21 41.7	14.653
8	11 12 50.95	2.0866	0 36 6.8	15.322	8	12 56 58.12	2.2830	11 36 19.3	14.599
9	11 14 56.21	2.0887	0 20 46.9	15.341	9	12 59 15.28	2.2890	11 50 53.6	14.543
10	11 17 1.60	2.0909	N. 0 5 25.9	15.359	10	13 1 32.80	2.2951	12 5 24.5	14.486
11	11 19 7.12	2.0932	S. 0 9 56.2	15.376	11	13 3 50.69	2.3012	12 19 51.9	14.427
12	11 21 12.79	2.0957	0 25 19.2	15.391	12	13 6 8.94	2.3074	12 34 15.7	14.365
13	11 23 18.61	2.0988	0 40 43.1	15.405	13	13 8 27.57	2.3136	12 48 35.7	14.301
14	11 25 24.57	2.1007	0 56 7.8	15.417	14	13 10 46.57	2.3198	13 2 51.8	14.236
15	11 27 30.69	2.1033	1 11 33.2	15.428	15	13 13 5.95	2.3263	13 17 4.0	14.169
16	11 29 36.97	2.1060	1 26 59.2	15.438	16	13 15 25.71	2.3326	13 31 12.1	14.100
17	11 31 43.41	2.1088	1 42 25.8	15.447	17	13 17 45.86	2.3390	13 45 16.0	14.028
18	11 33 50.03	2.1118	1 57 52.9	15.455	18	13 20 6.39	2.3455	13 59 15.5	13.955
19	11 35 56.83	2.1148	2 13 20.4	15.461	19	13 22 27.32	2.3521	14 13 10.6	13.880
20	11 38 3.80	2.1178	2 28 48.2	15.465	20	13 24 48.64	2.3586	14 27 1.1	13.803
21	11 40 10.96	2.1209	2 44 16.2	15.468	21	13 27 10.35	2.3652	14 40 47.0	13.724
22	11 42 18.31	2.1242	2 59 44.4	15.470	22	13 29 32.46	2.3719	14 54 28.0	13.643
23	11 44 25.86	2.1276	S. 3 15 12.6	15.470	23	13 31 54.98	2.3787	S. 15 8 4.1	13.560
FRIDAY 30.					SUNDAY, JUNE 1.				
0	11 46 33.62	2.1310	S. 3 30 40.8	15.469	0	13 34 17.90	2.3854	S. 15 21 35.2	13.475
1	11 48 41.58	2.1344	3 46 8.9	15.467	PHASES OF THE MOON.				
2	11 50 49.75	2.1380	4 1 36.8	15.463					
3	11 52 58.14	2.1417	4 17 4.5	15.458					
4	11 55 6.75	2.1454	4 32 31.8	15.451					
5	11 57 15.59	2.1493	4 47 58.6	15.442					
6	11 59 24.67	2.1532	5 3 24.8	15.432					
7	12 1 33.98	2.1572	5 18 50.4	15.421					
8	12 3 43.53	2.1612	5 34 15.3	15.408					
9	12 5 53.33	2.1654	5 49 39.3	15.393					
10	12 8 3.38	2.1697	6 5 2.4	15.377					
11	12 10 13.69	2.1740	6 20 24.5	15.359	PERIGEE AND APOGEE.				
12	12 12 24.26	2.1784	6 35 45.5	15.340					
13	12 14 35.10	2.1829	6 51 5.3	15.319					
14	12 16 46.21	2.1875	7 6 23.8	15.297					
15	12 18 57.60	2.1922	7 21 40.9	15.273					
16	12 21 9.27	2.1969	7 36 56.5	15.247					
17	12 23 21.23	2.2017	7 52 10.5	15.219					
18	12 25 33.47	2.2065	8 7 22.8	15.190					
19	12 27 46.01	2.2116	8 22 33.3	15.159					
20	12 29 58.86	2.2167	8 37 41.9	15.127					
21	12 32 12.01	2.2218	8 52 48.6	15.093					
22	12 34 25.47	2.2270	9 7 53.1	15.057					
23	12 36 39.25	2.2323	9 22 55.4	15.019					
24	12 38 53.35	2.2377	S. 9 37 55.4	14.980					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Sun	W.	113° 50' 55"	2677	115° 26' 6"	2659	117° 5' 41"	2641	118° 43' 41"	2623
	Venus	W.	79 29 37	2731	81 5 36	2712	82 42 0	2692	84 18 50	2673
	Pollux	W.	44 3 8	2394	45 46 51	2373	47 31 4	2354	49 15 45	2334
	Spica	E.	47 31 17	2356	45 46 39	2339	44 1 36	2323	42 16 9	2306
	Antares	E.	93 13 39	2345	91 28 45	2328	89 43 26	2310	87 57 41	2293
2	Venus	W.	92 29 21	2569	94 8 41	2564	95 48 26	2546	97 28 35	2530
	Pollux	W.	58 6 10	2249	59 53 35	2225	61 41 26	2208	63 29 42	2192
	Regulus	W.	21 4 13	2251	22 51 25	2229	24 39 10	2208	26 27 25	2190
	Spica	E.	33 23 1	2229	31 35 16	2215	29 47 11	2202	27 58 46	2190
	Antares	E.	79 2 40	2209	77 14 26	2193	75 25 48	2177	73 36 46	2163
3	Venus	W.	105 54 58	2452	107 37 19	2438	109 19 59	2425	111 2 58	2412
	Pollux	W.	72 36 55	2118	74 27 27	2104	76 18 20	2092	78 9 32	2080
	Regulus	W.	35 35 22	2107	37 26 10	2093	39 17 20	2080	41 8 50	2068
	Antares	E.	64 25 59	2091	62 34 46	2079	60 43 14	2066	58 51 23	2055
4	Pollux	W.	87 29 48	2030	89 22 35	2022	91 15 35	2015	93 8 46	2009
	Regulus	W.	50 30 50	2016	52 24 0	2007	54 17 23	1999	56 10 59	1992
	Antares	E.	49 27 57	2006	47 34 32	1998	45 40 55	1991	43 47 7	1985
	α Aquilæ	E.	102 33 50	2016	100 55 17	2000	99 16 22	2087	97 37 9	2075
5	Pollux	W.	102 36 40	1990	104 30 30	1989	106 24 22	1988	108 18 15	1989
	Regulus	W.	65 41 11	1971	67 35 31	1969	69 29 54	1968	71 24 19	1967
	Antares	E.	34 16 1	1965	32 21 31	1963	30 26 59	1963	28 32 26	1963
	α Aquilæ	E.	89 17 54	2045	87 37 44	2045	85 57 33	2047	84 17 25	2051
6	Regulus	W.	80 56 5	1979	82 50 13	1983	84 44 14	1988	86 38 7	1994
	Spica	W.	26 56 8	1999	28 49 44	2001	30 43 17	2003	32 36 46	2007
	α Aquilæ	E.	75 58 57	2000	74 20 2	2016	72 41 27	2035	71 3 22	2056
	Fomalhaut	E.	100 29 3	2373	98 44 50	2375	97 0 39	2378	95 16 32	2383
	Mars	E.	106 33 52	2201	104 45 26	2206	102 57 8	2212	101 8 59	2219
	Jupiter	E.	108 46 24	2029	106 53 35	2034	105 0 54	2039	103 8 21	2045
7	Regulus	W.	96 4 41	2037	97 57 18	2047	99 49 39	2058	101 41 43	2070
	Spica	W.	42 2 2	2043	43 54 29	2053	45 46 41	2063	47 38 37	2074
	α Aquilæ	E.	63 1 2	2003	61 26 38	2049	59 53 4	2063	58 20 24	2080
	Fomalhaut	E.	86 38 2	2423	84 55 0	2436	83 12 16	2450	81 29 52	2466
	Mars	E.	92 11 0	2202	90 24 5	2274	88 37 27	2288	86 51 7	2298
	Jupiter	E.	93 48 18	2086	91 56 58	2097	90 5 54	2108	88 15 7	2120
	α Pegasi	E.	107 55 8	2202	106 6 44	2210	104 18 31	2218	102 30 30	2227
8	Spica	W.	56 53 41	2139	58 43 41	2154	60 33 18	2170	62 22 31	2185
	α Aquilæ	E.	50 53 19	2320	49 27 45	2307	48 3 42	2303	46 41 17	2285
	Fomalhaut	E.	73 4 7	2566	71 24 26	2591	69 45 18	2617	68 6 46	2645
	Mars	E.	78 4 17	2371	76 20 0	2387	74 36 6	2403	72 52 36	2420
	Jupiter	E.	79 6 5	2186	77 17 20	2204	75 28 58	2220	73 41 0	2236
	α Pegasi	E.	93 34 21	2208	91 48 4	2202	90 2 8	2218	88 16 35	2234
9	Spica	W.	71 22 35	2209	73 9 20	2227	74 55 39	2205	76 41 31	2223
	Antares	W.	25 35 16	2264	27 22 8	2269	29 8 34	2300	30 54 34	2318
	Fomalhaut	E.	60 4 13	2611	58 29 59	2650	56 56 36	2691	55 24 6	2635
	Mars	E.	64 21 25	2613	62 40 30	2633	61 0 2	2653	59 20 2	2673

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
1	SUN W.	120° 23' 5"	2604	122° 0' 54"	2587	123° 40' 7"	2570	125° 19' 43"	2553
	Venus W.	85 56 6	2655	87 33 47	2636	89 11 53	2617	90 50 25	2599
	Pollux W.	51 0 55	2315	52 46 33	2296	54 32 38	2277	56 19 11	2260
	Spica E.	40 30 18	2280	38 44 3	2274	36 57 25	2258	35 10 24	2243
	Antares E.	86 11 31	2275	84 24 55	2258	82 37 54	2242	80 50 29	2226
2	Venus W.	99 9 7	2513	100 50 2	2497	102 31 19	2482	104 12 58	2467
	Pollux W.	65 18 22	2176	67 7 26	2160	68 56 54	2145	70 46 44	2132
	Regulus W.	28 16 8	2172	30 5 18	2154	31 54 55	2137	33 44 57	2122
	Spica E.	26 10 3	2179	24 21 3	2169	22 31 48	2161	20 42 21	2155
	Antares E.	71 47 21	2147	69 57 34	2132	68 7 24	2116	66 16 52	2104
3	Venus W.	112 46 15	2400	114 29 49	2389	116 13 40	2378	117 57 46	2368
	Pollux W.	80 1 2	2068	81 52 50	2058	83 44 54	2048	85 37 14	2039
	Regulus W.	43 0 39	2056	44 52 46	2044	46 45 11	2033	48 37 53	2024
	Antares E.	56 59 14	2044	55 6 48	2034	53 14 6	2024	51 21 9	2014
4	Pollux W.	95 2 6	2003	96 55 35	1999	98 49 11	1995	100 42 53	1992
	Regulus W.	58 4 46	1966	59 58 42	1962	61 52 45	1977	63 46 55	1974
	Antares E.	41 53 9	1979	39 59 2	1975	38 4 48	1970	36 10 27	1967
	α Aquilæ E.	95 57 40	2565	94 17 57	2557	92 38 3	2551	90 58 1	2548
5	Pollux W.	110 12 7	1990	112 5 57	1993	113 59 43	1996	115 53 24	2000
	Regulus W.	73 18 45	1968	75 13 10	1970	77 7 32	1972	79 1 51	1975
	Antares E.	26 37 53	1963	24 43 21	1965	22 48 52	1968	20 54 27	1972
	α Aquilæ E.	82 37 22	2556	80 57 27	2564	79 17 42	2574	77 38 11	2586
6	Regulus W.	88 31 50	2001	90 25 22	2009	92 18 42	2017	94 11 49	2027
	Spica W.	34 30 9	2019	36 23 24	2019	38 16 29	2026	40 9 22	2035
	α Aquilæ E.	69 25 43	2080	67 48 36	2076	66 12 4	2076	64 36 12	2076
	Fomalhaut E.	93 32 31	2387	91 48 37	2393	90 4 52	2402	88 21 20	2412
	Mars E.	99 21 0	2226	97 33 11	2234	95 45 34	2243	93 58 10	2252
	Jupiter E.	101 15 57	2052	99 23 44	2059	97 31 42	2068	95 39 53	2077
7	Regulus W.	103 33 28	2083	105 24 54	2096	107 16 0	2109	109 6 45	2124
	Spica W.	49 30 16	2086	51 21 37	2088	53 12 39	2112	55 3 20	2125
	α Aquilæ E.	56 48 43	2060	55 18 5	2034	53 48 35	2094	52 20 18	2158
	Fomalhaut E.	79 47 51	2483	78 6 14	2502	76 25 3	2522	74 44 20	2543
	Mars E.	85 5 5	2311	83 19 22	2326	81 33 59	2330	79 48 57	2355
	Jupiter E.	86 24 39	2133	84 34 30	2146	82 44 41	2159	80 55 12	2174
	α Pegasi E.	100 42 43	2237	98 55 11	2249	97 7 56	2261	95 20 59	2274
8	Spica W.	64 11 21	2201	65 59 47	2218	67 47 48	2225	69 35 24	2232
	α Aquilæ E.	45 20 36	2587	44 1 47	2609	42 44 59	2623	41 30 21	2630
	Fomalhaut E.	66 28 52	2675	64 51 38	2705	63 15 5	2738	61 39 16	2773
	Mars E.	71 9 30	2438	69 26 49	2456	67 44 34	2475	66 2 46	2494
	Jupiter E.	71 53 26	2252	70 6 16	2270	68 19 32	2287	66 33 14	2305
	α Pegasi E.	86 31 25	2350	84 46 39	2368	83 2 19	2387	81 18 26	2406
9	Spica W.	78 26 57	2349	80 11 56	2360	81 56 28	2379	83 40 33	2397
	Antares W.	32 40 7	2337	34 25 13	2355	36 9 52	2373	37 54 5	2392
	Fomalhaut E.	53 52 31	2982	52 21 56	3033	50 52 24	3086	49 23 57	3143
	Mars E.	57 40 30	2503	56 1 26	2614	54 22 50	2635	52 44 49	2657

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	V <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
9	Jupiter E.	64 47 22	9393	63 1 56	9349	61 16 57	9361	59 32 26	9380
	α Pegasi E.	79 35 0	9495	77 52 1	9445	76 9 31	9466	74 27 30	9487
	Saturn E.	97 15 32	9399	95 30 15	9347	93 45 24	9365	92 0 59	9384
	Sun E.	134 49 52	9597	133 10 53	9615	131 32 19	9633	129 54 9	9659
10	Spica W.	85 24 12	9417	87 7 23	9435	88 50 8	9454	90 32 26	9473
	Antares W.	39 37 51	9411	41 21 10	9430	43 4 2	9449	44 46 27	9468
	Fomalhaut E.	47 56 39	9904	46 30 34	9970	45 5 47	9340	43 42 22	9417
	Jupiter E.	50 56 45	9477	49 15 0	9498	47 33 44	9518	45 52 56	9539
	Mars E.	51 7 5	9678	49 29 56	9699	47 53 15	9721	46 17 3	9744
	α Pegasi E.	66 5 1	9601	64 26 7	9625	62 47 46	9650	61 9 59	9676
	Saturn E.	83 25 36	9478	81 43 52	9497	80 2 35	9517	78 21 46	9537
	Sun E.	121 49 38	9747	120 14 1	9766	118 38 49	9786	117 4 3	9806
11	Antares W.	53 11 56	9561	54 51 45	9580	56 31 8	9597	58 10 7	9615
	Jupiter E.	37 36 4	9643	35 58 7	9664	34 20 39	9686	32 43 40	9707
	Mars E.	38 23 25	9856	36 50 10	9880	35 17 25	9903	33 45 10	9927
	α Pegasi E.	53 9 56	9815	51 35 47	9845	50 2 17	9876	48 29 27	9908
	Saturn E.	70 4 23	9834	68 26 14	9853	66 48 31	9879	65 11 14	9891
	Sun E.	109 16 40	9905	107 44 27	9994	106 12 39	9943	104 41 15	9962
12	Antares W.	66 19 0	9709	67 55 37	9719	69 31 52	9735	71 7 46	9750
	Mars E.	26 11 49	9060	24 42 50	9090	23 14 28	9123	21 46 46	9158
	α Pegasi E.	40 56 12	9096	39 27 57	9140	38 0 36	9188	36 34 12	9239
	Saturn E.	57 11 10	9786	55 36 24	9805	54 2 2	9822	52 28 3	9840
	Sun E.	97 10 9	9055	95 41 4	9079	94 12 20	9090	92 43 58	9107
13	Antares W.	79 2 13	9895	80 36 9	9838	82 9 47	9852	83 43 8	9865
	α Aquilæ W.	36 57 11	5004	37 54 3	4885	38 52 46	4749	39 53 10	4633
	Saturn E.	44 44 0	9931	43 12 21	9950	41 41 5	9968	40 10 12	9985
	Sun E.	85 27 10	9167	84 0 45	9209	82 34 38	9217	81 8 49	9231
14	Antares W.	91 25 50	9994	92 57 38	9935	94 29 12	9946	96 0 33	9955
	α Aquilæ W.	45 15 39	4941	46 23 26	4186	47 32 5	4136	48 41 32	4090
	Saturn E.	32 41 35	9064	31 13 6	9105	29 45 3	9129	28 17 28	9154
	α Arietis E.	56 38 56	9946	55 7 36	9959	53 36 32	9971	52 5 43	9989
	Sun E.	74 3 43	9996	72 39 27	9907	71 15 24	9919	69 51 34	9930
15	α Aquilæ W.	54 38 29	9922	55 51 26	9897	57 4 49	9874	58 18 35	9854
	α Arietis E.	44 34 55	9032	43 5 22	9043	41 36 1	9051	40 6 52	9060
	Sun E.	62 55 26	9379	61 32 45	9387	60 10 14	9395	58 47 52	9408
16	α Aquilæ W.	64 32 11	9779	65 47 42	9761	67 3 25	9749	68 19 20	9738
	Fomalhaut W.	40 0 43	4190	41 10 25	4063	42 21 3	4019	43 32 31	3964
	Jupiter W.	24 37 22	9167	26 4 11	9164	27 31 3	9169	28 57 58	9180
	α Arietis E.	32 43 54	9106	31 15 52	9116	29 48 2	9197	28 20 25	9138
	Sun E.	51 58 3	9436	50 36 27	9442	49 14 58	9447	47 53 35	9459
17	α Aquilæ W.	74 41 25	9696	75 58 14	9692	77 15 10	9686	78 32 12	9680
	Fomalhaut W.	49 40 23	9785	50 55 41	9757	52 11 28	9739	53 27 41	9708
	Jupiter W.	36 12 48	9158	37 39 48	9158	39 6 48	9157	40 33 49	9157
	α Pegasi W.	27 3 41	9916	28 16 45	9839	29 31 7	9773	30 46 37	9716
	Sun E.	41 7 56	9473	39 47 2	9477	38 26 12	9480	37 5 26	9483

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
9	Jupiter E.	57 48 23	9399	56 4 47	9419	54 21 39	9438	52 38 58	9458
	α Pegasi E.	72 45 58	9509	71 4 57	9531	69 24 27	9553	67 44 28	9577
	Saturn E.	90 17 1	9403	88 33 30	9421	86 50 25	9440	85 7 47	9459
	Sun E.	126 16 24	9670	126 39 4	9689	125 2 10	9708	123 25 41	9736
10	Spica W.	92 14 17	9492	93 55 42	9511	95 36 40	9530	97 17 12	9548
	Antares W.	46 28 25	9487	48 9 56	9506	49 51 1	9524	51 31 41	9542
	Fomalhaut E.	42 20 25	3500	41 0 1	3591	39 41 17	3691	38 24 20	3799
	Jupiter E.	44 12 37	9559	42 32 46	9580	40 53 23	9601	39 14 29	9622
	Mars E.	44 41 21	9766	43 6 8	9788	41 31 24	9811	39 57 10	9833
	α Pegasi E.	59 32 47	9792	57 56 10	9799	56 20 8	9758	54 44 43	9785
	Saturn E.	76 41 24	9556	75 1 29	9575	73 22 0	9595	71 42 58	9615
	Sun E.	115 29 43	9826	113 55 49	9846	112 22 21	9866	110 49 18	9885
11	Antares W.	59 48 41	9638	61 26 51	9651	63 4 37	9668	64 42 0	9685
	Jupiter E.	31 7 10	9730	29 31 10	9753	27 55 40	9776	26 20 41	9801
	Mars E.	32 13 26	9952	30 42 13	9977	29 11 32	3003	27 41 23	3031
	α Pegasi E.	46 57 19	9942	45 25 54	9977	43 55 13	3014	42 25 18	3054
	Saturn E.	63 34 22	9710	61 57 56	9730	60 21 56	9749	58 46 21	9767
	Sun E.	103 10 15	9981	101 39 39	3000	100 9 26	3018	98 39 36	3037
12	Antares W.	72 43 20	9766	74 18 33	9781	75 53 26	9796	77 27 59	9811
	Mars E.	20 19 47	3198	18 53 36	3244	17 28 19	3296	16 4 3	3359
	α Pegasi E.	35 8 49	3294	33 44 31	3356	32 21 24	3423	30 59 34	3497
	Saturn E.	50 54 27	9859	49 21 15	9877	47 48 27	9895	46 16 2	9913
	Sun E.	91 15 57	3124	89 48 16	3140	88 20 55	3156	86 53 53	3172
13	Antares W.	85 16 12	9878	86 48 59	9890	88 21 31	9901	89 53 48	9913
	α Aquilæ W.	40 55 6	4536	41 58 26	4449	43 3 3	4373	44 8 49	4303
	Saturn E.	38 39 41	3004	37 9 33	3023	35 39 49	3043	34 10 30	3063
	Sun E.	79 43 17	3245	78 18 1	3258	76 53 0	3270	75 28 14	3283
14	Antares W.	97 31 42	9985	99 2 39	9974	100 33 25	9982	102 4 0	9991
	α Aquilæ W.	49 51 43	4049	51 2 34	4013	52 14 1	3980	53 26 0	3950
	Saturn E.	26 50 24	3189	25 23 53	3211	23 57 57	3244	22 32 40	3264
	α Arietis E.	50 35 8	9993	49 4 46	3003	47 34 37	3013	46 4 40	3022
	Sun E.	68 27 57	3340	67 4 32	3351	65 41 19	3360	64 18 17	3370
15	α Aquilæ W.	59 32 42	3835	60 47 8	3817	62 1 53	3801	63 16 54	3786
	α Arietis E.	38 37 54	3069	37 9 7	3078	35 40 31	3088	34 12 7	3097
	Sun E.	57 25 38	3410	56 3 33	3417	54 41 36	3423	53 19 46	3430
16	α Aquilæ W.	69 35 27	3798	70 51 44	3780	72 8 10	3719	73 24 44	3706
	Fomalhaut W.	44 44 46	3991	45 57 44	3882	47 11 22	3847	48 25 36	3815
	Jupiter W.	30 24 55	3180	31 51 52	3159	33 18 50	3158	34 45 49	3156
	α Arietis E.	26 53 1	3149	25 25 51	3162	23 58 56	3177	22 32 19	3194
	Sun E.	46 32 17	3457	45 11 5	3462	43 49 58	3465	42 28 55	3469
17	α Aquilæ W.	79 49 20	3676	81 6 33	3672	82 23 50	3668	83 41 11	3665
	Fomalhaut W.	54 44 18	3688	56 1 18	3667	57 18 40	3649	58 36 22	3632
	Jupiter W.	42 0 50	3156	43 27 52	3155	44 54 55	3154	46 21 59	3153
	α Pegasi W.	32 3 7	3667	33 20 29	3623	34 38 38	3585	35 57 29	3550
	Sun E.	35 44 43	3467	34 24 4	3490	33 3 29	3494	31 42 58	3497

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
18	$\alpha$ Aquilæ	W.	84° 58' 35"	3062	86° 16' 3"	3060	87° 33' 33"	3058	88° 51' 5"	3056
	Fomalhaut	W.	59 54 22	3015	61 12 40	3500	62 31 15	3506	63 50 5	3579
	Jupiter	W.	47 49 5	3151	49 16 13	3150	50 43 22	3148	52 10 33	3147
	$\alpha$ Pegasi	W.	37 16 58	3519	38 37 1	3491	39 57 35	3467	41 18 36	3444
	SUN	E.	30 22 30	3500	29 2 6	3505	27 41 47	3509	26 21 33	3514
23	SUN	W.	25 11 59	3340	26 35 24	3337	27 59 4	3314	29 22 59	3308
	Regulus	E.	61 7 42	2931	59 36 3	2925	58 4 16	2918	56 32 20	2911
	Spica	E.	115 11 12	2931	113 39 32	2923	112 7 42	2916	110 35 43	2908
24	SUN	W.	36 26 2	3244	37 51 19	3233	39 16 49	3222	40 42 32	3211
	Regulus	E.	48 50 23	2874	47 17 31	2867	45 44 30	2859	44 11 18	2851
	Spica	E.	102 53 21	2868	101 20 21	2860	99 47 11	2852	98 13 50	2843
25	SUN	W.	47 54 26	3154	49 21 30	3143	50 48 47	3139	52 16 18	3119
	Regulus	E.	36 22 44	2910	34 48 29	2902	33 14 4	2795	31 39 29	2788
	Spica	E.	90 24 12	2797	88 49 40	2787	87 14 55	2777	85 39 57	2768
26	SUN	W.	59 37 34	3058	61 6 35	3046	62 35 51	3033	64 5 23	3019
	Venus	W.	20 14 10	3114	21 42 2	3103	23 10 8	3090	24 38 30	3076
	Spica	E.	77 41 40	2713	76 5 18	2709	74 28 41	2691	72 51 49	2679
27	SUN	W.	71 37 13	2951	73 8 27	2938	74 39 58	2924	76 11 47	2909
	Venus	W.	32 4 32	3007	33 34 36	2993	35 4 58	2978	36 35 38	2964
	Pollux	W.	27 11 6	2739	28 47 4	2707	30 23 35	2684	32 0 37	2669
	Spica	E.	64 43 28	2619	63 4 59	2606	61 26 12	2593	59 47 8	2580
	Antares	E.	110 26 56	2611	108 48 16	2599	107 9 19	2585	105 30 4	2579
28	SUN	W.	83 55 32	2835	85 29 14	2820	87 3 16	2805	88 37 37	2799
	Venus	W.	44 13 35	2989	45 46 8	2974	47 19 0	2959	48 52 12	2943
	Pollux	W.	40 12 45	2585	41 52 28	2547	43 32 36	2530	45 13 8	2513
	Spica	E.	51 27 20	2515	49 46 27	2509	48 5 16	2488	46 23 46	2475
	Antares	E.	97 9 14	2505	95 28 7	2491	93 46 41	2477	92 4 55	2463
29	SUN	W.	96 34 28	2713	98 10 51	2697	99 47 35	2689	101 24 39	2686
	Venus	W.	56 43 16	2765	58 18 30	2749	59 54 5	2733	61 30 1	2718
	Pollux	W.	53 41 39	2431	55 24 30	2415	57 7 44	2398	58 51 21	2389
	Regulus	W.	16 41 45	2467	18 23 44	2440	20 6 21	2416	21 49 33	2394
	Spica	E.	37 51 33	2408	36 8 10	2396	34 24 29	2383	32 40 30	2371
30	Antares	E.	83 31 6	2391	81 47 19	2377	80 3 11	2369	78 18 42	2348
	SUN	W.	109 35 9	2591	111 14 16	2577	112 53 43	2562	114 33 30	2548
	Venus	W.	69 34 49	2641	71 12 48	2626	72 51 48	2611	74 29 48	2596
	Pollux	W.	67 34 58	2307	69 20 47	2293	71 6 57	2279	72 53 27	2266
	Regulus	W.	30 32 47	2309	32 18 43	2287	34 5 2	2271	35 51 44	2256
31	Antares	E.	69 31 11	2278	67 44 40	2264	65 57 48	2251	64 10 36	2237
	SUN	W.	122 57 12	2482	124 38 50	2470	126 20 46	2458	128 2 59	2446
	Venus	W.	82 48 2	2527	84 28 37	2515	86 9 29	2502	87 50 39	2490
	Pollux	W.	81 50 58	2200	83 39 25	2188	85 26 10	2176	87 17 13	2165
	Regulus	W.	44 50 37	2187	46 39 24	2174	48 28 30	2162	50 17 55	2151
	Antares	E.	55 9 44	2174	53 20 38	2163	51 31 14	2151	49 41 32	2140
	$\alpha$ Aquilæ	E.	107 34 26	2208	106 0 8	2185	104 25 20	2163	102 50 3	2148

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
18	$\alpha$ Aquilæ W.	90 8 39	3655	91 26 14	3654	92 43 50	3654	94 1 26	3655
	Fomalhaut W.	65 9 10	3559	66 28 29	3547	67 48 1	3536	69 7 45	3526
	Jupiter W.	53 37 46	3145	55 5 1	3143	56 32 19	3141	57 59 39	3138
	$\alpha$ Pegasi W.	42 40 3	3493	44 1 54	3493	45 24 7	3385	46 46 41	3368
	SUN E.	25 1 24	3519	23 41 21	3525	22 21 25	3534	21 1 38	3544
23	SUN W.	30 47 8	3990	32 11 31	3978	33 36 6	3967	35 0 58	3955
	Regulus E.	55 0 15	2904	53 28 1	2897	51 55 38	2889	50 23 5	2882
	Spica E.	109 3 34	2991	107 31 16	2983	105 58 48	2985	104 26 10	2976
24	SUN W.	42 8 28	3300	43 34 37	3188	45 1 0	3177	46 27 36	3166
	Regulus E.	42 37 56	2843	41 4 24	2835	39 30 41	2827	37 56 48	2818
	Spica E.	96 40 18	2834	95 6 34	2825	93 32 39	2816	91 58 32	2806
25	SUN W.	53 44 4	3108	55 12 4	3096	56 40 19	3083	58 8 49	3071
	Regulus E.	30 4 43	2778	28 29 47	2771	26 54 41	2764	25 19 26	2757
	Spica E.	84 4 45	2756	82 29 20	2746	80 53 41	2735	79 17 48	2724
26	SUN W.	65 35 12	3006	67 5 17	2993	68 35 38	2979	70 6 17	2965
	Venus W.	26 7 9	3063	27 36 4	3049	29 5 16	3035	30 34 45	3021
	Spica E.	71 14 41	2667	69 37 17	2655	67 59 37	2643	66 21 41	2631
27	SUN W.	77 43 55	2894	79 16 22	2880	80 49 7	2866	82 22 10	2851
	Venus W.	38 6 36	2949	39 37 53	2935	41 9 28	2920	42 41 22	2905
	Pollux W.	33 38 8	2641	35 16 7	2631	36 54 34	2621	38 33 27	2613
	Spica E.	58 7 46	2567	56 28 6	2555	54 48 9	2542	53 7 54	2528
	Antares E.	103 50 31	2559	102 10 39	2546	100 30 29	2533	98 50 1	2519
28	SUN W.	90 12 19	2774	91 47 21	2759	93 22 43	2744	94 58 25	2728
	Venus W.	50 25 44	2698	51 59 36	2611	53 33 49	2796	55 8 22	2780
	Pollux W.	46 54 3	2496	48 35 22	2479	50 17 5	2469	51 59 11	2447
	Spica E.	44 41 57	2461	42 59 49	2448	41 17 22	2435	39 34 37	2421
	Antares E.	90 22 50	2449	88 40 25	2434	86 57 39	2420	85 14 33	2405
29	SUN W.	103 2 4	2651	104 39 50	2636	106 17 56	2621	107 56 22	2606
	Venus W.	63 6 17	2709	64 42 54	2687	66 19 52	2672	67 57 10	2656
	Pollux W.	60 35 21	2367	62 19 43	2353	64 4 26	2337	65 49 31	2322
	Regulus W.	23 33 17	2373	25 17 30	2355	27 2 10	2337	28 47 16	2319
	Spica E.	30 56 14	2359	29 11 41	2348	27 26 51	2337	25 41 45	2327
	Antares E.	76 33 53	2334	74 48 43	2320	73 3 13	2306	71 17 22	2292
30	SUN W.	116 13 37	2534	117 54 3	2520	119 34 48	2507	121 15 51	2494
	Venus W.	76 8 48	2582	77 48 8	2568	79 27 47	2554	81 7 45	2540
	Pollux W.	74 40 17	2262	76 27 28	2238	78 14 59	2225	80 2 49	2212
	Regulus W.	37 38 48	2241	39 26 14	2227	41 14 1	2213	43 2 9	2200
	Antares E.	62 23 4	2224	60 35 13	2211	58 47 2	2198	56 58 32	2186
31	SUN W.	129 45 28	2436	131 28 12	2426	133 11 10	2416	134 54 22	2406
	Venus W.	89 32 6	2479	91 13 49	2467	92 55 48	2457	94 38 2	2447
	Pollux W.	89 6 33	2155	90 56 9	2145	92 46 0	2135	94 36 6	2126
	Regulus W.	52 7 37	2139	53 57 36	2126	55 47 52	2118	57 36 23	2109
	Antares E.	47 51 33	2129	46 1 18	2119	44 10 48	2110	42 20 4	2100
	$\alpha$ Aquilæ E.	101 14 19	2724	99 38 11	2707	98 1 41	2692	96 24 51	2679

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from	Diff. for 1 hour.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>			<sup>°</sup> <sup>'</sup> <sup>''</sup>				<sup>s</sup> <sup>m</sup> <sup>s</sup>	
Sun.	1	4 35 54.68	10.225	N.22° 2' 55.9"	+20.50	15 48' 38"	68.41	<sup>m</sup> 2 28.42	<sup>s</sup> 0.368	
Mon.	2	4 40 0.29	10.241	22 10 56.6	19.54	15 48.25	68.47	2 19.39	0.384	
Tues.	3	4 44 6.29	10.256	22 18 34.1	18.57	15 48.12	68.52	2 9.97	0.399	
Wed.	4	4 48 12.64	10.271	22 25 48.2	17.60	15 47.99	68.57	2 0.21	0.414	
Thur.	5	4 52 19.33	10.286	22 32 39.0	16.62	15 47.87	68.62	1 50.10	0.429	
Frid.	6	4 56 26.37	10.299	22 39 6.2	15.63	15 47.75	68.66	1 39.64	0.442	
Sat.	7	5 0 33.74	10.312	22 45 9.5	14.64	15 47.63	68.70	1 28.86	0.455	
Sun.	8	5 4 41.42	10.325	22 50 49.0	13.64	15 47.52	68.74	1 17.78	0.467	
Mon.	9	5 8 49.38	10.337	22 56 4.6	12.64	15 47.41	68.78	1 6.40	0.479	
Tues.	10	5 12 57.61	10.348	23 0 55.9	11.63	15 47.30	68.81	0 54.76	0.490	
Wed.	11	5 17 6.09	10.358	23 5 22.9	10.62	15 47.20	68.84	0 42.87	0.500	
Thur.	12	5 21 14.81	10.367	23 9 25.6	9.60	15 47.10	68.87	0 30.75	0.509	
Frid.	13	5 25 23.73	10.376	23 13 3.8	8.58	15 47.00	68.90	0 18.42	0.518	
Sat.	14	5 29 32.85	10.383	23 16 17.4	7.55	15 46.91	68.92	0 5.89	0.525	
Sun.	15	5 33 42.13	10.389	23 19 6.4	6.52	15 46.83	68.93	0 6.80	0.532	
Mon.	16	5 37 51.55	10.393	23 21 30.7	5.49	15 46.75	68.95	0 19.62	0.537	
Tues.	17	5 42 1.08	10.397	23 23 30.3	4.46	15 46.67	68.96	0 32.57	0.541	
Wed.	18	5 46 10.69	10.400	23 25 5.1	3.43	15 46.60	68.97	0 45.58	0.544	
Thur.	19	5 50 20.35	10.402	23 26 15.1	2.39	15 46.54	68.98	0 58.65	0.546	
Frid.	20	5 54 30.05	10.402	23 27 0.3	1.36	15 46.48	68.98	1 11.75	0.546	
Sat.	21	5 58 39.75	10.402	23 27 20.5	+ 0.32	15 46.43	68.98	1 24.86	0.546	
Sun.	22	6 2 49.42	10.400	23 27 15.8	- 0.71	15 46.38	68.98	1 37.94	0.544	
Mon.	23	6 6 59.03	10.397	23 26 46.3	1.73	15 46.34	68.97	1 50.95	0.541	
Tues.	24	6 11 8.57	10.393	23 25 52.1	2.76	15 46.30	68.96	2 3.89	0.537	
Wed.	25	6 15 18.00	10.389	23 24 33.1	3.78	15 46.27	68.94	2 16.72	0.532	
Thur.	26	6 19 27.29	10.383	23 22 49.5	4.81	15 46.24	68.93	2 29.42	0.526	
Frid.	27	6 23 36.42	10.376	23 20 41.3	5.84	15 46.22	68.91	2 41.97	0.519	
Sat.	28	6 27 45.39	10.368	23 18 8.5	6.86	15 46.20	68.89	2 54.33	0.511	
Sun.	29	6 31 54.14	10.359	23 15 11.3	7.88	15 46.19	68.86	3 6.50	0.502	
Mon.	30	6 36 2.66	10.349	23 11 49.6	8.90	15 46.18	68.83	3 18.43	0.492	
Tues.	31	6 40 10.94	10.339	N.23 8 3.6	- 9.92	15 46.17	68.80	3 30.12	0.481	

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.19 from the Sidereal Time.

+ prefixed to the hourly change of declination indicates that north declinations are increasing;  
— that they are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Equation of Time, to be added to		Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	subtracted from Mean Time.				
Sun.	1	<sup>h</sup> 4 <sup>m</sup> 35 <sup>s</sup> 55.10	10.224	N. 22° 2' 56.6"	+20.50	<sup>m</sup> 2 <sup>s</sup> 28.40	<sup>s</sup> 0.368	<sup>h</sup> 4 <sup>m</sup> 38 <sup>s</sup> 23.50		
Mon.	2	4 40 0.69	10.240	22 10 57.3	19.54	2 19.37	0.384	4 42 20.06		
Tues.	3	4 44 6.66	10.255	22 18 34.7	18.57	2 9.95	0.399	4 46 16.61		
Wed.	4	4 48 12.98	10.270	22 25 48.8	17.60	2 0.19	0.414	4 50 13.17		
Thur.	5	4 52 19.65	10.285	22 32 39.5	16.62	1 50.08	0.429	4 54 9.73		
Frid.	6	4 56 26.66	10.298	22 39 6.6	15.63	1 39.63	0.442	4 58 6.29		
Sat.	7	5 0 34.00	10.311	22 45 9.9	14.64	1 28.85	0.455	5 2 2.85		
Sun.	8	5 4 41.64	10.324	22 50 49.3	13.64	1 17.77	0.467	5 5 59.41		
Mon.	9	5 8 49.57	10.336	22 56 4.8	12.64	1 6.39	0.479	5 9 55.96		
Tues.	10	5 12 57.77	10.347	23 0 56.0	11.63	0 54.75	0.490	5 13 52.52		
Wed.	11	5 17 6.22	10.357	23 5 23.0	10.62	0 42.86	0.500	5 17 49.08		
Thur.	12	5 21 14.90	10.366	23 9 25.7	9.60	0 30.74	0.509	5 21 45.64		
Frid.	13	5 25 23.78	10.375	23 13 3.8	8.58	0 18.42	0.518	5 25 42.20		
Sat.	14	5 29 32.87	10.382	23 16 17.4	7.55	0 5.89	0.525	5 29 38.76		
Sun.	15	5 33 42.11	10.388	23 19 6.4	6.52	0 6.80	0.532	5 33 35.31		
Mon.	16	5 37 51.49	10.392	23 21 30.7	5.49	0 19.62	0.537	5 37 31.87		
Tues.	17	5 42 0.99	10.396	23 23 30.3	4.46	0 32.56	0.541	5 41 28.43		
Wed.	18	5 46 10.56	10.399	23 25 5.1	3.43	0 45.57	0.544	5 45 24.99		
Thur.	19	5 50 20.19	10.401	23 26 15.1	2.39	0 58.64	0.546	5 49 21.55		
Frid.	20	5 54 29.85	10.401	23 27 0.3	1.36	1 11.74	0.546	5 53 18.11		
Sat.	21	5 58 39.51	10.401	23 27 20.5	+ 0.32	1 24.85	0.546	5 57 14.66		
Sun.	22	6 2 49.14	10.399	23 27 15.8	- 0.71	1 37.92	0.544	6 1 11.22		
Mon.	23	6 6 58.71	10.396	23 26 46.3	1.73	1 50.93	0.541	6 5 7.78		
Tues.	24	6 11 8.21	10.392	23 25 52.1	2.76	2 3.87	0.537	6 9 4.34		
Wed.	25	6 15 17.60	10.388	23 24 33.2	3.78	2 16.70	0.532	6 13 0.90		
Thur.	26	6 19 26.86	10.382	23 22 49.7	4.81	2 29.40	0.526	6 16 57.46		
Frid.	27	6 23 35.96	10.375	23 20 41.6	5.84	2 41.95	0.519	6 20 54.01		
Sat.	28	6 27 44.88	10.367	23 18 8.9	6.86	2 54.31	0.511	6 24 50.57		
Sun.	29	6 31 53.60	10.358	23 15 11.7	7.88	3 6.47	0.502	6 28 47.13		
Mon.	30	6 36 2.09	10.348	23 11 50.1	8.90	3 18.40	0.492	6 32 43.69		
Tues.	31	6 40 10.34	10.338	N. 23 8 4.2	- 9.92	3 30.09	0.481	6 36 40.25		

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

+ prefixed to the hourly change of declination indicates that north declinations are increasing ;  
— that they are decreasing.Diff. for 1 hour.  
+ 9°.8565  
(Table III.)



AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal $^{\circ}$ .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	152	70° 35' 13.7	34° 38.4	143.63	−0.35	0.0061936	+25.2	19 18 26.20	
2	153	71 32 40.2	32 4.7	143.58	0.32	.0062535	24.7	19 14 30.29	
3	154	72 30 5.6	29 29.9	143.54	0.27	.0063122	24.2	19 10 34.38	
4	155	73 27 29.9	26 54.0	143.49	0.17	.0063696	23.7	19 6 38.46	
5	156	74 24 53.2	24 17.2	143.45	−0.07	.0064258	23.1	19 2 42.55	
6	157	75 22 15.6	21 39.4	143.42	+0.06	.0064807	22.6	18 58 46.64	
7	158	76 19 37.2	19 0.8	143.39	0.19	.0065343	22.0	18 54 50.73	
8	159	77 16 58.2	16 21.6	143.37	0.34	.0065865	21.4	18 50 54.81	
9	160	78 14 18.7	13 42.0	143.35	0.47	.0066373	20.8	18 46 58.90	
10	161	79 11 38.8	11 1.9	143.33	0.60	.0066865	20.1	18 43 2.99	
11	162	80 8 58.4	8 21.3	143.31	0.70	.0067340	19.4	18 39 7.08	
12	163	81 6 17.5	5 40.2	143.29	0.80	.0067797	18.6	18 35 11.16	
13	164	82 3 36.2	2 58.7	143.27	0.86	.0068233	17.8	18 31 15.25	
14	165	83 0 54.6	0 16.9	143.25	0.88	.0068648	16.9	18 27 19.34	
15	166	83 58 12.6	57 34.7	143.24	0.87	.0069041	15.9	18 23 23.43	
16	167	84 55 30.3	54 52.2	143.22	0.84	.0069411	14.9	18 19 27.51	
17	168	85 52 47.6	52 9.3	143.21	0.79	.0069756	13.9	18 15 31.60	
18	169	86 50 4.5	49 26.0	143.19	0.70	.0070076	12.8	18 11 35.69	
19	170	87 47 21.0	46 42.3	143.18	0.60	.0070369	11.7	18 7 39.78	
20	171	88 44 37.1	43 58.3	143.16	0.48	.0070636	10.6	18 3 43.87	
21	172	89 41 52.8	41 13.8	143.14	0.35	.0070878	9.5	17 59 47.96	
22	173	90 39 7.9	38 28.7	143.12	0.21	.0071094	8.5	17 55 52.05	
23	174	91 36 22.4	35 43.0	143.09	+0.08	.0071285	7.5	17 51 56.13	
24	175	92 33 36.4	32 56.8	143.07	−0.02	.0071451	6.5	17 48 0.21	
25	176	93 30 49.9	30 10.2	143.05	0.12	.0071593	5.4	17 44 4.30	
26	177	94 28 2.9	27 23.0	143.03	0.18	.0071713	4.6	17 40 8.39	
27	178	95 25 15.4	24 35.3	143.01	0.22	.0071813	3.8	17 36 12.48	
28	179	96 22 27.5	21 47.2	142.99	0.23	.0071893	3.0	17 32 16.56	
29	180	97 19 39.1	18 58.7	142.98	0.20	.0071954	2.2	17 28 20.65	
30	181	98 16 50.4	16 9.8	142.96	0.14	.0071999	1.5	17 24 24.74	
31	182	99 14 1.4	13 20.6	142.95	−0.08	0.0072029	+ 0.9	17 20 28.83	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 hour. — 9 <sup>h</sup> .8296 (Table II.)	

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	
1	16 31.6	16 34.8	60 32.5	+1.11	60 44.2	+0.82	9 16.8	2.38	11.3
2	16 36.9	16 38.0	60 52.1	+0.49	60 56.0	+0.15	10 16.1	2.57	12.3
3	16 37.9	16 36.6	60 55.6	-0.21	60 50.8	-0.58	11 19.2	2.69	13.3
4	16 34.1	16 30.5	60 41.7	0.93	60 28.5	1.26	12 24.2	2.70	14.3
5	16 25.9	16 20.3	60 11.5	1.56	59 51.2	1.81	13 27.9	2.58	15.3
6	16 14.0	16 7.1	59 27.9	2.02	59 2.6	2.17	14 27.7	2.38	16.3
7	15 59.8	15 52.3	58 35.9	2.26	58 8.3	2.31	15 22.4	2.16	17.3
8	15 44.7	15 37.3	57 40.5	2.31	57 13.0	2.26	16 12.1	1.97	18.3
9	15 30.0	15 23.1	56 46.4	2.17	56 21.0	2.05	16 57.6	1.83	19.3
10	15 16.6	15 10.7	55 57.2	1.90	55 35.4	1.73	17 40.3	1.74	20.3
11	15 5.4	15 0.6	55 15.7	1.55	54 58.3	1.35	18 21.5	1.70	21.3
12	14 56.5	14 53.1	54 43.3	1.15	54 30.7	0.94	19 2.2	1.71	22.3
13	14 50.3	14 48.3	54 20.6	0.74	54 13.0	0.54	19 43.6	1.76	23.3
14	14 46.8	14 46.0	54 7.7	-0.34	54 4.8	-0.15	20 26.7	1.84	24.3
15	14 45.9	14 46.1	54 4.1	+0.03	54 5.3	+0.10	21 12.1	1.95	25.3
16	14 47.1	14 48.5	54 8.7	0.25	54 13.9	0.50	22 0.1	2.06	26.3
17	14 50.4	14 52.6	54 20.7	0.63	54 28.9	0.73	22 50.5	2.15	27.3
18	14 55.1	14 57.5	54 38.3	0.83	54 46.8	0.91	23 42.7	2.10	28.3
19	15 1.1	15 4.4	55 0.2	0.99	55 12.5	1.05	6		29.3
20	15 8.0	15 11.7	55 25.5	1.11	55 39.2	1.16	0 35.3	2.19	0.7
21	15 15.6	15 19.6	55 53.4	1.20	56 8.1	1.23	1 27.3	2.13	1.7
22	15 23.7	15 27.9	56 23.2	1.26	56 38.5	1.29	2 17.8	2.06	2.7
23	15 32.1	15 36.5	56 54.2	1.32	57 10.2	1.34	3 6.4	1.99	3.7
24	15 40.9	15 45.4	57 26.4	1.36	57 42.7	1.37	3 53.6	1.94	4.7
25	15 49.8	15 54.3	57 59.1	1.37	58 15.5	1.36	4 40.1	1.94	5.7
26	15 58.7	16 3.0	58 31.7	1.34	58 47.6	1.30	5 27.0	1.98	6.7
27	16 7.2	16 11.1	59 3.0	1.25	59 17.5	1.17	6 15.6	2.08	7.7
28	16 14.8	16 18.1	59 30.9	1.06	59 42.9	0.93	7 7.2	2.23	8.7
29	16 20.9	16 23.0	59 53.1	0.76	60 1.1	0.57	8 2.7	2.41	9.7
30	16 24.6	16 25.3	60 6.7	+0.35	60 9.5	+0.11	9 2.4	2.57	10.7
31	16 25.2	16 24.3	60 9.3	-0.15	60 5.9	-0.42	10 5.2	2.66	11.7
32	16 22.5	16 19.8	59 59.2	-0.70	59 49.2	-0.96	11 8.9	2.62	12.7

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 1.					TUESDAY 3.				
0	13 34 17.90	2.3854	S. 15° 21' 35.2"	13.475	0	15 36 34.94	2.6935	S. 23° 51' 53.4"	7.050
1	13 36 41.23	2.3922	15 35 1.1	13.387	1	15 39 16.69	2.6982	23 58 51.1	6.872
2	13 39 4.96	2.3989	15 48 21.7	13.298	2	15 41 58.72	2.7027	24 5 38.1	6.694
3	13 41 29.10	2.4058	16 1 36.9	13.207	3	15 44 41.01	2.7069	24 12 14.4	6.515
4	13 43 53.66	2.4127	16 14 46.6	13.114	4	15 47 23.55	2.7111	24 18 39.9	6.334
5	13 46 18.63	2.4196	16 27 50.6	13.018	5	15 50 6.34	2.7151	24 24 54.5	6.151
6	13 48 44.01	2.4265	16 40 48.8	12.921	6	15 52 49.36	2.7189	24 30 58.0	5.967
7	13 51 9.81	2.4335	16 53 41.1	12.822	7	15 55 32.61	2.7227	24 36 50.5	5.782
8	13 53 36.03	2.4404	17 6 27.4	12.730	8	15 58 16.08	2.7263	24 42 31.9	5.597
9	13 56 2.66	2.4473	17 19 7.5	12.617	9	16 0 59.76	2.7297	24 48 2.2	5.411
10	13 58 29.71	2.4543	17 31 41.4	12.512	10	16 3 43.64	2.7328	24 53 21.2	5.223
11	14 0 57.18	2.4613	17 44 8.9	12.403	11	16 6 27.70	2.7358	24 58 28.9	5.034
12	14 3 25.07	2.4683	17 56 29.8	12.293	12	16 9 11.94	2.7387	25 3 25.3	4.845
13	14 5 53.38	2.4753	18 8 44.1	12.189	13	16 11 56.35	2.7415	25 8 10.3	4.654
14	14 8 22.11	2.4823	18 20 51.6	12.088	14	16 14 40.92	2.7440	25 12 43.8	4.462
15	14 10 51.26	2.4893	18 32 52.3	11.982	15	16 17 25.63	2.7463	25 17 5.7	4.269
16	14 13 20.83	2.4963	18 44 45.9	11.874	16	16 20 10.48	2.7485	25 21 16.1	4.077
17	14 15 50.82	2.5033	18 56 32.4	11.714	17	16 22 55.45	2.7505	25 25 14.9	3.884
18	14 18 21.23	2.5103	19 8 11.6	11.592	18	16 25 40.54	2.7523	25 29 2.2	3.691
19	14 20 52.05	2.5172	19 19 43.5	11.468	19	16 28 25.73	2.7539	25 32 37.8	3.496
20	14 23 23.29	2.5242	19 31 7.8	11.342	20	16 31 11.01	2.7553	25 36 1.7	3.300
21	14 25 54.95	2.5311	19 42 24.5	11.214	21	16 33 56.37	2.7566	25 39 13.8	3.104
22	14 28 27.02	2.5379	19 53 33.5	11.084	22	16 36 41.80	2.7576	25 42 14.2	2.908
23	14 30 59.50	2.5448	S. 20° 4' 34.6"	10.952	23	16 39 27.28	2.7583	S. 25° 45' 2.8"	2.712
MONDAY 2.					WEDNESDAY 4.				
0	14 33 32.39	2.5516	S. 20° 15' 27.8"	10.818	0	16 42 12.80	2.7590	S. 25° 47' 39.6"	2.515
1	14 36 5.69	2.5583	20 26 12.8	10.682	1	16 44 58.36	2.7595	25 50 4.6	2.318
2	14 38 39.39	2.5650	20 36 49.6	10.544	2	16 47 43.94	2.7597	25 52 17.8	2.122
3	14 41 13.49	2.5717	20 47 18.1	10.404	3	16 50 29.53	2.7598	25 54 19.2	1.924
4	14 43 47.99	2.5783	20 57 38.1	10.262	4	16 53 15.12	2.7597	25 56 8.7	1.727
5	14 46 22.88	2.5848	21 7 49.5	10.118	5	16 56 0.69	2.7593	25 57 46.4	1.530
6	14 48 58.17	2.5913	21 17 52.3	9.973	6	16 58 46.23	2.7587	25 59 12.3	1.333
7	14 51 33.84	2.5978	21 27 46.3	9.825	7	17 1 31.74	2.7580	26 0 26.4	1.136
8	14 54 9.90	2.6042	21 37 31.3	9.675	8	17 4 17.19	2.7570	26 1 28.6	0.938
9	14 56 46.34	2.6104	21 47 7.3	9.524	9	17 7 2.58	2.7558	26 2 18.9	0.740
10	14 59 23.15	2.6167	21 56 34.2	9.371	10	17 9 47.89	2.7545	26 2 57.4	0.544
11	15 2 0.34	2.6228	22 5 51.8	9.216	11	17 12 33.12	2.7530	26 3 24.2	0.348
12	15 4 37.89	2.6288	22 15 0.1	9.059	12	17 15 18.25	2.7512	26 3 39.2	-0.152
13	15 7 15.80	2.6348	22 23 58.9	8.901	13	17 18 3.27	2.7499	26 3 42.4	+0.044
14	15 9 54.07	2.6407	22 32 48.2	8.741	14	17 20 48.16	2.7471	26 3 33.9	0.239
15	15 12 32.69	2.6465	22 41 27.8	8.579	15	17 23 32.92	2.7448	26 3 13.7	0.434
16	15 15 11.65	2.6522	22 49 57.7	8.416	16	17 26 17.54	2.7423	26 2 41.8	0.628
17	15 17 50.95	2.6577	22 58 17.7	8.250	17	17 29 2.00	2.7396	26 1 58.3	0.822
18	15 20 30.58	2.6632	23 6 27.7	8.083	18	17 31 46.29	2.7367	26 1 3.2	1.015
19	15 23 10.54	2.6686	23 14 27.7	7.915	19	17 34 30.40	2.7336	25 59 56.5	1.207
20	15 25 50.81	2.6738	23 22 17.5	7.745	20	17 37 14.32	2.7303	25 58 38.3	1.398
21	15 28 31.39	2.6789	23 29 57.1	7.573	21	17 39 58.04	2.7268	25 57 8.7	1.589
22	15 31 12.28	2.6840	23 37 26.3	7.400	22	17 42 41.54	2.7232	25 55 27.6	1.780
23	15 33 53.47	2.6888	23 44 45.1	7.226	23	17 45 24.82	2.7194	25 53 35.1	1.969
24	15 36 34.94	2.6935	S. 23° 51' 53.4"	7.050	24	17 48 7.87	2.7154	S. 25° 51' 31.3"	2.157

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 5.					SATURDAY 7.				
0	17 48 7.87	2.7154	S. 25 51 31.3	2.157	0	19 51 18.25	2.3830	S. 20 56 41.7	9.499
1	17 50 50.67	2.7119	25 49 16.3	2.344	1	19 53 40.98	2.3747	20 47 8.4	9.610
2	17 53 33.21	2.7088	25 46 50.0	2.531	2	19 56 3.22	2.3665	20 37 28.5	9.719
3	17 56 15.49	2.7023	25 44 12.6	2.710	3	19 58 24.96	2.3589	20 27 42.1	9.806
4	17 58 57.49	2.6977	25 41 24.1	2.900	4	20 0 46.21	2.3500	20 17 49.4	9.931
5	18 1 39.21	2.6928	25 38 24.6	3.083	5	20 3 6.96	2.3417	20 7 50.4	10.034
6	18 4 20.63	2.6878	25 35 14.1	3.265	6	20 5 27.21	2.3334	19 57 45.3	10.135
7	18 7 1.75	2.6827	25 31 52.8	3.445	7	20 7 46.97	2.3252	19 47 34.2	10.235
8	18 9 42.55	2.6773	25 28 20.7	3.625	8	20 10 6.24	2.3170	19 37 17.1	10.333
9	18 12 23.03	2.6718	25 24 37.8	3.803	9	20 12 25.01	2.3088	19 26 54.2	10.429
10	18 15 3.17	2.6663	25 20 44.3	3.980	10	20 14 43.29	2.3007	19 16 25.6	10.523
11	18 17 42.98	2.6606	25 16 40.2	4.155	11	20 17 1.09	2.2926	19 5 51.4	10.616
12	18 20 22.44	2.6547	25 12 25.7	4.329	12	20 19 18.40	2.2844	18 55 11.7	10.707
13	18 23 1.54	2.6486	25 8 0.8	4.502	13	20 21 35.22	2.2763	18 44 26.6	10.796
14	18 25 40.27	2.6424	25 3 25.5	4.673	14	20 23 51.56	2.2683	18 33 36.2	10.883
15	18 28 18.63	2.6362	24 58 40.0	4.843	15	20 26 7.42	2.2603	18 22 40.6	10.969
16	18 30 56.61	2.6298	24 53 44.3	5.012	16	20 28 22.80	2.2524	18 11 39.9	11.053
17	18 33 34.20	2.6233	24 48 38.6	5.178	17	20 30 37.71	2.2445	18 0 34.2	11.135
18	18 36 11.40	2.6167	24 43 22.9	5.344	18	20 32 52.14	2.2366	17 49 23.7	11.215
19	18 38 48.20	2.6100	24 37 57.3	5.507	19	20 35 6.10	2.2288	17 38 8.4	11.295
20	18 41 24.59	2.6030	24 32 22.0	5.669	20	20 37 19.59	2.2210	17 26 48.3	11.373
21	18 44 0.56	2.5960	24 26 37.0	5.830	21	20 39 32.62	2.2133	17 15 23.7	11.448
22	18 46 36.11	2.5889	24 20 42.4	5.989	22	20 41 45.18	2.2056	17 3 54.6	11.522
23	18 49 11.23	2.5817	S. 24 14 38.3	6.147	23	20 43 57.29	2.1980	S. 16 52 21.1	11.594
FRIDAY 6.					SUNDAY 8.				
0	18 51 45.92	2.5745	S. 24 8 24.8	6.309	0	20 46 8.94	2.1904	S. 16 40 43.3	11.665
1	18 54 20.17	2.5679	24 2 2.0	6.456	1	20 48 20.14	2.1829	16 29 1.3	11.734
2	18 56 53.98	2.5598	23 55 30.1	6.606	2	20 50 30.89	2.1754	16 17 15.2	11.803
3	18 59 27.34	2.5523	23 48 49.1	6.758	3	20 52 41.19	2.1680	16 5 25.1	11.868
4	19 2 0.25	2.5447	23 41 59.1	6.907	4	20 54 51.05	2.1607	15 53 31.0	11.933
5	19 4 32.70	2.5370	23 35 0.3	7.053	5	20 57 0.47	2.1533	15 41 33.1	11.996
6	19 7 4.69	2.5293	23 27 52.7	7.199	6	20 59 9.45	2.1461	15 29 31.5	12.058
7	19 9 36.22	2.5216	23 20 36.4	7.342	7	21 1 18.00	2.1380	15 17 26.2	12.118
8	19 12 7.28	2.5137	23 13 11.6	7.483	8	21 3 26.13	2.1319	15 5 17.3	12.177
9	19 14 37.86	2.5058	23 5 38.4	7.623	9	21 5 33.83	2.1248	14 53 5.0	12.233
10	19 17 7.97	2.4978	22 57 56.9	7.761	10	21 7 41.11	2.1179	14 40 49.3	12.289
11	19 19 37.60	2.4897	22 50 7.1	7.897	11	21 9 47.98	2.1111	14 28 30.3	12.343
12	19 22 6.74	2.4817	22 42 9.2	8.032	12	21 11 54.44	2.1043	14 16 8.1	12.397
13	19 24 35.40	2.4737	22 34 3.3	8.164	13	21 14 0.49	2.0975	14 3 42.7	12.448
14	19 27 3.58	2.4656	22 25 49.5	8.295	14	21 16 6.14	2.0908	13 51 14.3	12.497
15	19 29 31.27	2.4574	22 17 27.9	8.423	15	21 18 11.39	2.0842	13 38 43.0	12.546
16	19 31 58.47	2.4492	22 8 58.7	8.550	16	21 20 16.24	2.0777	13 26 8.8	12.594
17	19 34 25.18	2.4410	22 0 21.9	8.676	17	21 22 20.71	2.0712	13 13 31.7	12.641
18	19 36 51.39	2.4327	21 51 37.6	8.799	18	21 24 24.79	2.0648	13 0 51.9	12.685
19	19 39 17.11	2.4245	21 42 46.0	8.920	19	21 26 28.49	2.0586	12 48 9.5	12.728
20	19 41 42.33	2.4162	21 33 47.2	9.040	20	21 28 31.82	2.0523	12 35 24.5	12.770
21	19 44 7.06	2.4080	21 24 41.2	9.158	21	21 30 34.77	2.0463	12 22 37.1	12.811
22	19 46 31.29	2.3997	21 15 28.2	9.274	22	21 32 37.36	2.0403	12 9 47.2	12.851
23	19 48 55.02	2.3913	21 6 8.3	9.387	23	21 34 39.59	2.0341	11 56 55.0	12.888
24	19 51 18.25	2.3830	S. 20 56 41.7	9.499	24	21 36 41.45	2.0281	S. 11 44 0.6	12.925

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 9.					WEDNESDAY 11.				
0	<sup>h</sup> 21 <sup>m</sup> 36 <sup>s</sup> 41.45	2.0281	S. 11° 44' 0.6"	12.995	0	<sup>h</sup> 23 <sup>m</sup> 8 <sup>s</sup> 45.47	1.8393	S. 1° 1' 18.7"	13.494
1	21 38 42.96	2.0223	11 31 4.0	12.993	1	23 10 35.77	1.8374	0 47 49.3	13.485
2	21 40 44.13	2.0166	11 18 5.2	12.996	2	23 12 25.96	1.8356	0 34 20.5	13.475
3	21 42 44.95	2.0108	11 5 4.4	13.029	3	23 14 16.04	1.8338	0 20 52.3	13.465
4	21 44 45.43	2.0052	10 52 1.7	13.082	4	23 16 6.01	1.8320	S. 0 7 24.7	13.453
5	21 46 45.58	1.9997	10 38 57.0	13.093	5	23 17 55.88	1.8304	N. 0 6 2.1	13.441
6	21 48 45.40	1.9942	10 25 50.5	13.123	6	23 19 45.66	1.8289	0 19 28.2	13.428
7	21 50 44.89	1.9889	10 12 42.3	13.159	7	23 21 35.35	1.8274	0 32 53.5	13.415
8	21 52 44.07	1.9837	9 59 32.3	13.180	8	23 23 24.95	1.8259	0 46 18.0	13.402
9	21 54 42.93	1.9784	9 46 20.7	13.206	9	23 25 14.46	1.8246	0 59 41.7	13.387
10	21 56 41.48	1.9733	9 33 7.6	13.231	10	23 27 3.90	1.8234	1 13 4.4	13.371
11	21 58 39.73	1.9682	9 19 53.0	13.256	11	23 28 53.27	1.8222	1 26 26.2	13.355
12	22 0 37.67	1.9632	9 6 36.9	13.279	12	23 30 42.56	1.8210	1 39 47.0	13.338
13	22 2 35.32	1.9584	8 53 19.5	13.301	13	23 32 31.79	1.8201	1 53 6.8	13.321
14	22 4 32.68	1.9537	8 40 0.8	13.322	14	23 34 20.97	1.8192	2 6 25.5	13.303
15	22 6 29.76	1.9490	8 26 40.8	13.342	15	23 36 10.09	1.8183	2 19 43.1	13.284
16	22 8 26.56	1.9443	8 13 19.7	13.361	16	23 37 59.16	1.8174	2 32 59.6	13.264
17	22 10 23.08	1.9397	7 59 57.5	13.379	17	23 39 48.18	1.8167	2 46 14.8	13.243
18	22 12 19.32	1.9352	7 46 34.2	13.397	18	23 41 37.16	1.8160	2 59 28.8	13.223
19	22 14 15.30	1.9308	7 33 9.9	13.413	19	23 43 26.10	1.8154	3 12 41.6	13.202
20	22 16 11.02	1.9266	7 19 44.7	13.428	20	23 45 15.01	1.8149	3 25 53.0	13.179
21	22 18 6.49	1.9224	7 6 18.6	13.442	21	23 47 3.89	1.8145	3 39 3.1	13.157
22	22 20 1.71	1.9182	6 52 51.7	13.455	22	23 48 52.75	1.8142	3 52 11.8	13.133
23	22 21 56.68	1.9142	S. 6 39 24.0	13.467	23	23 50 41.59	1.8138	N. 4 5 19.1	13.110
TUESDAY 10.					THURSDAY 12.				
0	22 23 51.41	1.9102	S. 6 25 55.6	13.478	0	23 52 30.41	1.8136	N. 4 18 25.0	13.086
1	22 25 45.90	1.9063	6 12 26.6	13.488	1	23 54 19.22	1.8135	4 31 29.4	13.080
2	22 27 40.16	1.9025	5 58 57.0	13.498	2	23 56 8.03	1.8134	4 44 32.2	13.073
3	22 29 34.20	1.8988	5 45 26.8	13.507	3	23 57 56.83	1.8133	4 57 33.4	13.067
4	22 31 28.02	1.8952	5 31 56.1	13.515	4	23 59 45.63	1.8134	5 10 33.0	12.979
5	22 33 21.62	1.8916	5 18 25.0	13.522	5	0 1 34.44	1.8136	5 23 30.9	12.952
6	22 35 15.01	1.8882	5 4 53.5	13.528	6	0 3 23.26	1.8138	5 36 27.2	12.923
7	22 37 8.20	1.8847	4 51 21.7	13.533	7	0 5 12.09	1.8141	5 49 21.7	12.894
8	22 39 1.18	1.8813	4 37 49.6	13.537	8	0 7 0.95	1.8145	6 2 14.5	12.865
9	22 40 53.96	1.8781	4 24 17.3	13.540	9	0 8 49.83	1.8148	6 15 5.5	12.834
10	22 42 46.55	1.8750	4 10 44.8	13.542	10	0 10 38.73	1.8153	6 27 54.6	12.803
11	22 44 38.96	1.8719	3 57 12.2	13.544	11	0 12 27.67	1.8159	6 40 41.8	12.772
12	22 46 31.18	1.8688	3 43 39.5	13.545	12	0 14 16.64	1.8165	6 53 27.2	12.740
13	22 48 23.22	1.8658	3 30 6.8	13.545	13	0 16 5.65	1.8173	7 6 10.6	12.707
14	22 50 15.10	1.8629	3 16 34.1	13.544	14	0 17 54.70	1.8179	7 18 52.0	12.673
15	22 52 6.81	1.8605	3 3 1.5	13.543	15	0 19 43.80	1.8187	7 31 31.3	12.638
16	22 53 58.36	1.8578	2 49 29.0	13.541	16	0 21 32.95	1.8197	7 44 8.6	12.603
17	22 55 49.75	1.8552	2 35 56.6	13.537	17	0 23 22.16	1.8207	7 56 43.7	12.568
18	22 57 40.98	1.8527	2 22 24.5	13.533	18	0 25 11.43	1.8217	8 9 16.7	12.532
19	22 59 32.07	1.8503	2 8 52.6	13.529	19	0 27 0.76	1.8228	8 21 47.5	12.495
20	23 1 23.02	1.8480	1 55 21.0	13.523	20	0 28 50.16	1.8239	8 34 16.1	12.458
21	23 3 13.83	1.8457	1 41 49.8	13.517	21	0 30 39.63	1.8251	8 46 42.5	12.421
22	23 5 4.50	1.8435	1 28 19.0	13.510	22	0 32 29.17	1.8264	8 59 6.6	12.382
23	23 6 55.05	1.8414	1 14 48.6	13.502	23	0 34 18.80	1.8278	9 11 28.3	12.342
24	23 8 45.47	1.8393	S. 1 1 18.7	13.494	24	0 36 8.51	1.8292	N. 9 23 47.6	12.302

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 13.					SUNDAY 15.				
0	<sup>h</sup> 0 <sup>m</sup> 36 <sup>s</sup> 8.51	1.8992	N. 9° 23' 47".6	12.302	0	<sup>h</sup> 2 <sup>m</sup> 6 <sup>s</sup> 39.43	1.9615	N. 18° 15' 36".0	9.587
1	0 37 58.30	1.8306	9 36 4.5	12.922	1	2 8 37.23	1.9653	18 25 9.0	9.519
2	0 39 48.18	1.8322	9 48 19.0	12.921	2	2 10 35.27	1.9692	18 34 37.4	9.436
3	0 41 38.16	1.8338	10 0 31.0	12.178	3	2 12 33.54	1.9731	18 44 1.3	9.360
4	0 43 28.24	1.8355	10 12 40.4	12.136	4	2 14 32.04	1.9770	18 53 20.6	9.283
5	0 45 18.42	1.8372	10 24 47.3	12.093	5	2 16 30.78	1.9809	19 2 35.3	9.206
6	0 47 8.70	1.8389	10 36 51.6	12.050	6	2 18 29.75	1.9848	19 11 45.3	9.127
7	0 48 59.09	1.8408	10 48 53.2	12.005	7	2 20 28.96	1.9888	19 20 50.6	9.048
8	0 50 49.60	1.8427	11 0 52.2	11.959	8	2 22 28.41	1.9929	19 29 51.1	8.968
9	0 52 40.22	1.8447	11 12 48.4	11.914	9	2 24 28.11	1.9970	19 38 46.7	8.887
10	0 54 30.96	1.8467	11 24 41.9	11.868	10	2 26 28.05	2.0010	19 47 37.5	8.806
11	0 56 21.82	1.8488	11 36 32.5	11.820	11	2 28 28.23	2.0051	19 56 23.4	8.723
12	0 58 12.81	1.8509	11 48 20.3	11.773	12	2 30 28.66	2.0092	20 5 4.3	8.640
13	1 0 3.93	1.8531	12 0 5.2	11.724	13	2 32 29.34	2.0133	20 13 40.2	8.556
14	1 1 55.18	1.8553	12 11 47.2	11.675	14	2 34 30.26	2.0174	20 22 11.0	8.472
15	1 3 46.57	1.8577	12 23 26.2	11.625	15	2 36 31.43	2.0216	20 30 36.8	8.386
16	1 5 38.10	1.8601	12 35 2.2	11.575	16	2 38 32.85	2.0258	20 38 57.4	8.300
17	1 7 29.78	1.8625	12 46 35.2	11.524	17	2 40 34.52	2.0300	20 47 12.7	8.213
18	1 9 21.60	1.8649	12 58 5.1	11.473	18	2 42 36.45	2.0342	20 55 22.8	8.124
19	1 11 13.57	1.8675	13 9 31.8	11.419	19	2 44 38.63	2.0384	21 3 27.6	8.035
20	1 13 5.70	1.8701	13 20 55.4	11.367	20	2 46 41.06	2.0426	21 11 27.0	7.945
21	1 14 57.98	1.8727	13 32 15.8	11.313	21	2 48 43.74	2.0468	21 19 21.0	7.855
22	1 16 50.42	1.8753	13 43 32.9	11.258	22	2 50 46.67	2.0510	21 27 9.6	7.764
23	1 18 43.02	1.8781	N. 13 54 46.7	11.203	23	2 52 49.86	2.0552	N. 21 34 52.7	7.672
SATURDAY 14.					MONDAY 16.				
0	1 20 35.79	1.8809	N. 14 5 57.2	11.147	0	2 54 53.30	2.0595	N. 21 42 30.2	7.578
1	1 22 26.73	1.8838	14 17 4.3	11.090	1	2 56 57.00	2.0637	21 50 2.1	7.485
2	1 24 21.84	1.8867	14 28 8.0	11.032	2	2 59 0.95	2.0679	21 57 28.4	7.391
3	1 26 15.13	1.8896	14 39 8.2	10.974	3	3 1 5.15	2.0722	22 4 49.0	7.296
4	1 28 8.59	1.8926	14 50 4.9	10.916	4	3 3 9.61	2.0764	22 12 3.9	7.199
5	1 30 2.24	1.8957	15 0 58.1	10.856	5	3 5 14.32	2.0806	22 19 12.9	7.102
6	1 31 56.07	1.8987	15 11 47.7	10.797	6	3 7 19.28	2.0848	22 26 16.1	7.004
7	1 33 50.08	1.9018	15 22 33.7	10.736	7	3 9 24.50	2.0891	22 33 13.4	6.906
8	1 35 44.29	1.9051	15 33 16.0	10.673	8	3 11 29.97	2.0932	22 40 4.8	6.807
9	1 37 38.69	1.9083	15 43 54.5	10.611	9	3 13 35.69	2.0974	22 46 50.2	6.707
10	1 39 33.29	1.9116	15 54 29.3	10.548	10	3 15 41.66	2.1017	22 53 29.6	6.605
11	1 41 28.08	1.9148	16 5 0.3	10.484	11	3 17 47.89	2.1059	23 0 2.8	6.502
12	1 43 23.07	1.9182	16 15 27.4	10.419	12	3 19 54.37	2.1101	23 6 29.9	6.400
13	1 45 18.26	1.9216	16 25 50.6	10.354	13	3 22 1.10	2.1142	23 12 50.8	6.298
14	1 47 13.66	1.9251	16 36 9.9	10.288	14	3 24 8.07	2.1183	23 19 5.6	6.194
15	1 49 9.27	1.9285	16 46 25.2	10.222	15	3 26 15.29	2.1224	23 25 14.1	6.088
16	1 51 5.08	1.9320	16 56 36.5	10.154	16	3 28 22.76	2.1265	23 31 16.2	5.983
17	1 53 1.11	1.9356	17 6 43.7	10.085	17	3 30 30.47	2.1305	23 37 12.0	5.877
18	1 54 57.35	1.9392	17 16 46.7	10.016	18	3 32 38.42	2.1346	23 43 1.4	5.769
19	1 56 53.81	1.9428	17 26 45.6	9.947	19	3 34 46.62	2.1387	23 48 44.3	5.661
20	1 58 50.49	1.9464	17 36 40.3	9.876	20	3 36 55.06	2.1428	23 54 20.7	5.552
21	2 0 47.38	1.9501	17 46 30.7	9.804	21	3 39 3.73	2.1465	23 59 50.6	5.443
22	2 2 44.50	1.9539	17 56 16.8	9.732	22	3 41 12.64	2.1505	24 5 13.9	5.333
23	2 4 41.85	1.9577	18 5 58.6	9.660	23	3 43 21.79	2.1545	24 10 30.5	5.223
24	2 6 39.43	1.9615	N. 18 15 36.0	9.587	24	3 45 31.18	2.1584	N. 24 15 40.5	5.110

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 17.					THURSDAY 19.				
0	<sup>h</sup> 3 <sup>m</sup> 45 <sup>s</sup> 31.18	2.1584	N.24 15' 40.5"	5.110	0	<sup>h</sup> 5 <sup>m</sup> 32 <sup>s</sup> 37.96	2.9797	N.26 0' 19.0"	0.936
1	3 47 40.80	2.1622	24 20 43.7	4.897	1	5 34 54.77	2.9805	25 59 18.8	1.071
2	3 49 50.64	2.1660	24 25 40.1	4.884	2	5 37 11.62	2.9813	25 58 10.5	1.205
3	3 52 07.1	2.1697	24 30 29.8	4.771	3	5 39 28.51	2.9818	25 56 54.2	1.340
4	3 54 11.01	2.1735	24 35 12.6	4.656	4	5 41 45.43	2.9823	25 55 29.7	1.476
5	3 56 21.53	2.1772	24 39 48.5	4.541	5	5 44 2.38	2.9828	25 53 57.1	1.611
6	3 58 32.27	2.1808	24 44 17.5	4.425	6	5 46 19.36	2.9831	25 52 16.4	1.746
7	4 0 43.23	2.1844	24 48 39.5	4.308	7	5 48 36.35	2.9833	25 50 27.6	1.881
8	4 2 54.40	2.1880	24 52 54.4	4.190	8	5 50 53.35	2.9835	25 48 30.7	2.017
9	4 5 5.79	2.1915	24 57 2.3	4.072	9	5 53 10.37	2.9837	25 46 25.6	2.153
10	4 7 17.38	2.1949	25 1 3.1	3.953	10	5 55 27.39	2.9837	25 44 12.5	2.286
11	4 9 29.18	2.1984	25 4 56.7	3.834	11	5 57 44.41	2.9836	25 41 51.3	2.422
12	4 11 41.19	2.2018	25 8 43.2	3.715	12	6 0 1.42	2.9834	25 39 21.9	2.557
13	4 13 53.40	2.2051	25 12 22.5	3.594	13	6 2 18.42	2.9830	25 36 44.4	2.692
14	4 16 5.80	2.2083	25 15 54.5	3.472	14	6 4 35.40	2.9826	25 33 58.9	2.826
15	4 18 18.40	2.2116	25 19 19.1	3.349	15	6 6 52.37	2.9820	25 31 5.3	2.961
16	4 20 31.19	2.2147	25 22 36.4	3.227	16	6 9 9.31	2.9821	25 28 3.6	3.096
17	4 22 44.17	2.2178	25 25 46.4	3.105	17	6 11 26.22	2.9816	25 24 53.8	3.231
18	4 24 57.33	2.2208	25 28 49.0	2.981	18	6 13 43.10	2.9810	25 21 35.9	3.366
19	4 27 10.67	2.2238	25 31 44.1	2.856	19	6 15 59.94	2.9809	25 18 10.0	3.498
20	4 29 24.19	2.2268	25 34 31.7	2.731	20	6 18 16.73	2.9794	25 14 36.1	3.632
21	4 31 37.89	2.2297	25 37 11.8	2.606	21	6 20 33.47	2.9786	25 10 54.1	3.767
22	4 33 51.75	2.2324	25 39 44.4	2.481	22	6 22 50.16	2.9777	25 7 4.1	3.900
23	4 36 5.78	2.2352	N.25 42 9.5	2.355	23	6 25 6.79	2.9767	N.25 3 61.	4.032
WEDNESDAY 18.					FRIDAY 20.				
0	4 38 19.97	2.2378	N.25 44 27.0	2.227	0	6 27 23.37	2.9757	N.24 59 0.2	4.165
1	4 40 34.32	2.2404	25 46 36.8	2.099	1	6 29 39.88	2.9746	24 54 46.3	4.297
2	4 42 48.82	2.2429	25 48 38.9	1.972	2	6 31 56.32	2.9733	24 50 24.5	4.430
3	4 45 3.47	2.2454	25 50 33.4	1.843	3	6 34 12.68	2.9720	24 45 54.7	4.562
4	4 47 18.27	2.2478	25 52 20.1	1.714	4	6 36 28.96	2.9707	24 41 17.0	4.693
5	4 49 33.21	2.2502	25 53 59.1	1.585	5	6 38 45.16	2.9693	24 36 31.5	4.824
6	4 51 48.29	2.2524	25 55 30.3	1.455	6	6 41 1.98	2.9679	24 31 38.1	4.956
7	4 54 3.50	2.2546	25 56 53.7	1.325	7	6 43 17.31	2.9663	24 26 36.8	5.086
8	4 56 18.84	2.2567	25 58 9.3	1.195	8	6 45 33.24	2.9647	24 21 27.8	5.215
9	4 58 34.30	2.2587	25 59 17.1	1.064	9	6 47 49.07	2.9630	24 16 11.0	5.345
10	5 0 49.88	2.2607	26 0 17.0	0.932	10	6 50 4.80	2.9613	24 10 46.4	5.474
11	5 3 5.58	2.2626	26 1 9.0	0.801	11	6 52 20.43	2.9596	24 5 14.1	5.603
12	5 5 21.39	2.2643	26 1 53.1	0.669	12	6 54 35.95	2.9577	23 59 34.0	5.731
13	5 7 37.30	2.2661	26 2 29.3	0.537	13	6 56 51.36	2.9558	23 53 46.3	5.858
14	5 9 53.32	2.2678	26 2 57.5	0.404	14	6 59 6.65	2.9538	23 47 51.0	5.986
15	5 12 9.43	2.2693	26 3 17.7	0.271	15	7 1 21.82	2.9518	23 41 48.0	6.113
16	5 14 25.63	2.2708	26 3 30.0	0.138	16	7 3 36.87	2.9498	23 35 37.4	6.239
17	5 16 41.92	2.2722	26 3 34.3	+0.004	17	7 5 51.80	2.9477	23 29 19.3	6.364
18	5 18 58.29	2.2735	26 3 30.5	-0.130	18	7 8 6.60	2.9456	23 22 53.7	6.489
19	5 21 14.74	2.2747	26 3 18.7	0.263	19	7 10 21.27	2.9433	23 16 20.6	6.613
20	5 23 31.26	2.2758	26 2 58.9	0.397	20	7 12 35.80	2.9411	23 9 40.1	6.737
21	5 25 47.84	2.2769	26 2 31.0	0.532	21	7 14 50.20	2.9388	23 2 52.1	6.861
22	5 28 4.49	2.2780	26 1 55.1	0.666	22	7 17 4.46	2.9365	22 55 56.8	6.983
23	5 30 21.20	2.2789	26 1 11.1	0.801	23	7 19 18.58	2.9342	22 48 54.1	7.106
24	5 32 37.96	2.2797	N.26 0 19.0	0.936	24	7 21 32.56	2.9317	N.22 41 44.1	7.227

**X.**

**JUNE, 1879.**

**101**



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 25.					FRIDAY 27.				
0	10 44 19.60	2.0403	N. 3 54 50.2	14.764	0	12 24 3.09	2.1461	S. 8 5 53.0	14.779
1	10 46 22.02	2.0406	3 40 3.5	14.783	1	12 26 11.98	2.1503	8 20 38.8	14.747
2	10 48 24.47	2.0410	3 25 15.1	14.821	2	12 28 21.13	2.1547	8 35 22.6	14.713
3	10 50 26.94	2.0414	3 10 25.0	14.848	3	12 30 30.54	2.1590	8 50 4.4	14.678
4	10 52 29.44	2.0420	2 55 33.4	14.873	4	12 32 40.21	2.1634	9 4 44.0	14.642
5	10 54 31.98	2.0427	2 40 40.3	14.898	5	12 34 50.15	2.1679	9 19 21.4	14.603
6	10 56 34.56	2.0434	2 25 45.7	14.921	6	12 37 0.36	2.1724	9 33 56.4	14.563
7	10 58 37.18	2.0442	2 10 49.8	14.942	7	12 39 10.84	2.1771	9 48 29.0	14.522
8	11 0 39.86	2.0451	1 55 52.6	14.963	8	12 41 21.61	2.1819	10 2 59.1	14.480
9	11 2 42.59	2.0460	1 40 54.2	14.983	9	12 43 32.67	2.1867	10 17 26.6	14.435
10	11 4 45.38	2.0470	1 25 54.6	15.009	10	12 45 44.02	2.1916	10 31 51.3	14.389
11	11 6 48.23	2.0481	1 10 53.9	15.019	11	12 47 55.66	2.1965	10 46 13.3	14.342
12	11 8 51.15	2.0493	0 55 52.3	15.035	12	12 50 7.60	2.2015	11 0 32.4	14.293
13	11 10 54.15	2.0506	0 40 49.7	15.051	13	12 52 19.84	2.2066	11 14 48.5	14.242
14	11 12 57.22	2.0518	0 25 46.2	15.064	14	12 54 32.39	2.2118	11 29 1.5	14.190
15	11 15 0.37	2.0532	N. 0 10 42.0	15.077	15	12 56 45.26	2.2171	11 43 11.3	14.137
16	11 17 3.61	2.0548	S. 0 4 23.0	15.088	16	12 58 58.44	2.2223	11 57 17.9	14.082
17	11 19 6.95	2.0564	0 19 28.6	15.098	17	13 1 11.94	2.2277	12 11 21.1	14.024
18	11 21 10.38	2.0581	0 34 34.8	15.107	18	13 3 25.77	2.2332	12 25 20.8	13.966
19	11 23 13.92	2.0599	0 49 41.5	15.115	19	13 5 39.93	2.2387	12 39 17.0	13.906
20	11 25 17.57	2.0617	1 4 48.6	15.122	20	13 7 54.42	2.2442	12 53 5.5	13.843
21	11 27 21.32	2.0635	1 19 56.1	15.127	21	13 10 9.24	2.2498	13 6 53.2	13.780
22	11 29 25.19	2.0656	1 35 3.9	15.132	22	13 12 24.40	2.2556	13 20 43.1	13.715
23	11 31 29.19	2.0677	S. 1 50 11.9	15.134	23	13 14 39.91	2.2613	S. 13 34 24.0	13.648
THURSDAY 26.					SATURDAY 28.				
0	11 33 33.31	2.0698	S. 2 5 20.0	15.136	0	13 16 55.76	2.2671	S. 13 48 0.8	13.579
1	11 35 37.57	2.0721	2 20 28.2	15.137	1	13 19 11.96	2.2730	14 1 33.5	13.509
2	11 37 41.96	2.0743	2 35 36.4	15.135	2	13 21 28.52	2.2789	14 15 1.9	13.437
3	11 39 46.49	2.0767	2 50 44.4	15.133	3	13 23 45.43	2.2848	14 28 26.0	13.364
4	11 41 51.17	2.0792	3 5 52.3	15.130	4	13 26 2.70	2.2909	14 41 45.6	13.288
5	11 43 56.00	2.0817	3 21 0.0	15.125	5	13 28 20.34	2.2970	14 55 0.6	13.211
6	11 46 0.98	2.0843	3 36 7.3	15.119	6	13 30 38.34	2.3031	15 8 10.9	13.133
7	11 48 6.12	2.0871	3 51 14.2	15.119	7	13 32 56.71	2.3093	15 21 16.5	13.052
8	11 50 11.43	2.0900	4 6 20.7	15.103	8	13 35 15.45	2.3155	15 34 17.2	12.970
9	11 52 16.92	2.0929	4 21 26.6	15.083	9	13 37 34.57	2.3218	15 47 12.9	12.886
10	11 54 22.58	2.0958	4 36 31.9	15.062	10	13 39 54.06	2.3281	16 0 3.5	12.800
11	11 56 28.42	2.0989	4 51 36.5	15.039	11	13 42 13.94	2.3345	16 12 48.9	12.719
12	11 58 34.45	2.1021	5 6 40.2	15.055	12	13 44 34.20	2.3409	16 25 29.0	12.633
13	12 0 40.67	2.1053	5 21 43.1	15.040	13	13 46 54.85	2.3473	16 38 3.7	12.539
14	12 2 47.09	2.1086	5 36 45.0	15.023	14	13 49 15.88	2.3537	16 50 32.9	12.440
15	12 4 53.70	2.1119	5 51 45.9	15.006	15	13 51 37.29	2.3601	17 2 56.5	12.345
16	12 7 0.52	2.1154	6 6 45.7	14.986	16	13 53 59.09	2.3667	17 15 14.3	12.248
17	12 9 7.55	2.1190	6 21 44.2	14.964	17	13 56 21.20	2.3732	17 27 26.3	12.151
18	12 11 14.80	2.1227	6 36 41.4	14.942	18	13 58 43.88	2.3798	17 39 32.4	12.051
19	12 13 22.27	2.1264	6 51 37.3	14.919	19	14 1 6.87	2.3864	17 51 32.4	11.949
20	12 15 29.97	2.1302	7 6 31.7	14.894	20	14 3 30.25	2.3930	18 3 26.3	11.846
21	12 17 37.89	2.1340	7 21 24.6	14.867	21	14 5 54.03	2.3997	18 15 13.9	11.740
22	12 19 46.05	2.1380	7 36 15.8	14.839	22	14 8 18.21	2.4062	18 26 55.1	11.633
23	12 21 54.45	2.1420	7 51 5.3	14.810	23	14 10 42.78	2.4128	18 38 29.8	11.524
24	12 24 3.09	2.1461	S. 8 5 53.0	14.779	24	14 13 7.75	2.4195	S. 18 49 58.0	11.414

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 29.					MONDAY 30.				
0	14 13 7.75	2.4195	8.18° 49' 58.0"	11.414	0	15 13 5.25	2.5738	8.22° 47' 41.5"	8.331
1	14 15 33.12	2.4262	19 1 19.5	11.309	1	15 15 39.86	2.5797	22 55 50.8	8.077
2	14 17 58.89	2.4339	19 12 34.2	11.187	2	15 18 14.81	2.5854	23 3 50.8	7.999
3	14 20 25.07	2.4396	19 23 41.9	11.070	3	15 20 50.10	2.5910	23 11 41.4	7.765
4	14 22 51.65	2.4462	19 34 42.6	10.952	4	15 23 25.73	2.5966	23 19 22.6	7.807
5	14 25 18.62	2.4528	19 45 36.2	10.833	5	15 26 1.69	2.6021	23 26 54.3	7.448
6	14 27 45.99	2.4595	19 56 22.6	10.719	6	15 28 37.98	2.6075	23 34 16.4	7.387
7	14 30 13.76	2.4662	20 7 1.6	10.588	7	15 31 14.59	2.6128	23 41 28.8	7.135
8	14 32 41.93	2.4728	20 17 33.2	10.464	8	15 33 51.51	2.6180	23 48 31.4	6.961
9	14 35 10.50	2.4794	20 27 57.3	10.337	9	15 36 28.75	2.6232	23 55 24.1	6.796
10	14 37 39.46	2.4859	20 38 13.7	10.208	10	15 39 6.29	2.6281	24 2 6.9	6.689
11	14 40 8.81	2.4925	20 48 22.3	10.078	11	15 41 44.12	2.6329	24 8 39.6	6.461
12	14 42 38.56	2.4991	20 58 23.1	9.947	12	15 44 22.24	2.6377	24 15 2.2	6.399
13	14 45 8.70	2.5055	21 8 15.9	9.813	13	15 47 0.64	2.6423	24 21 14.7	6.192
14	14 47 39.22	2.5119	21 18 0.6	9.678	14	15 49 39.32	2.6468	24 27 16.9	5.950
15	14 50 10.13	2.5183	21 27 37.2	9.541	15	15 52 18.26	2.6519	24 33 8.7	5.777
16	14 52 41.42	2.5248	21 37 5.5	9.402	16	15 54 57.46	2.6565	24 38 50.1	5.603
17	14 55 13.10	2.5312	21 46 25.4	9.261	17	15 57 36.92	2.6597	24 44 21.1	5.436
18	14 57 45.16	2.5374	21 55 36.8	9.118	18	16 0 16.62	2.6636	24 49 41.5	5.264
19	15 0 17.59	2.5436	22 4 39.6	8.974	19	16 2 56.55	2.6674	24 54 51.3	5.075
20	15 2 50.39	2.5498	22 13 33.7	8.829	20	16 5 36.71	2.6719	24 59 50.5	4.897
21	15 5 23.57	2.5560	22 22 19.1	8.682	21	16 8 17.09	2.6747	25 4 38.9	4.717
22	15 7 57.11	2.5619	22 30 55.6	8.533	22	16 10 57.67	2.6780	25 9 16.5	4.537
23	15 10 31.00	2.5678	22 39 23.1	8.383	23	16 13 38.45	2.6813	25 13 43.3	4.356
24	15 13 5.25	2.5738	8.22° 47' 41.5"	8.331	24	16 16 19.43	2.6845	8.25 17 59.2	4.174

PHASES OF THE MOON.

○ Full Moon, . . . . .	d	h	m
☾ Last Quarter, . . . . .	11	4	56.0
● New Moon, . . . . .	19	8	19.5
☽ First Quarter, . . . . .	26	17	56.0

☾ Perigee, . . . . .	d	h
☾ Apogee, . . . . .	2	17.1
☾ Perigee, . . . . .	30	17.1

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	11h.	P. L. of Diff.	Vib.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Pollux W.	96 26 26	2117	98 16 59	2109	100 7 45	2101	101 58 42	2094
	Venus W.	96 20 30	2437	98 3 12	2428	99 46 7	2419	101 29 14	2412
	Regulus W.	59 29 9	2009	61 20 9	2000	63 11 23	2003	65 2 49	2075
	Antares E.	40 29 5	2091	38 37 52	2083	36 46 27	2075	34 54 50	2068
	$\alpha$ Aquilæ E.	94 47 43	2666	93 10 18	2656	91 32 39	2647	89 54 48	2640
2	Pollux W.	111 15 48	2070	113 7 33	2067	114 59 23	2064	116 51 17	2063
	Regulus W.	74 22 35	2047	76 14 56	2043	78 7 23	2039	79 59 56	2037
	Spica W.	20 25 41	2088	22 16 59	2077	24 8 34	2068	26 0 23	2061
	$\alpha$ Aquilæ E.	81 43 51	2629	80 5 35	2629	78 27 23	2637	76 49 18	2643
	Fomalhaut E.	106 26 11	2470	104 44 15	2469	103 2 4	2450	101 19 40	2442
3	Regulus W.	89 23 15	2035	91 15 54	2037	93 8 30	2040	95 1 2	2048
	Spica W.	35 21 22	2046	37 13 44	2047	39 6 5	2048	40 58 25	2050
	$\alpha$ Aquilæ E.	68 42 11	2711	67 5 46	2728	65 29 49	2756	63 54 24	2784
	Fomalhaut E.	92 45 38	2426	91 2 41	2427	89 19 45	2430	87 36 53	2434
	Jupiter E.	103 46 37	2070	101 54 51	2071	100 3 7	2073	98 11 27	2076
	$\alpha$ Pegasi E.	114 21 7	2211	112 32 56	2208	110 44 41	2206	108 56 23	2205
4	Regulus W.	104 22 7	2070	106 13 53	2077	108 5 27	2086	109 56 48	2094
	Spica W.	50 18 47	2073	52 10 28	2079	54 1 59	2087	55 53 18	2096
	$\alpha$ Aquilæ E.	56 7 31	2971	54 36 42	3022	53 6 57	3078	51 38 21	3139
	Fomalhaut E.	79 4 48	2479	77 23 5	2492	75 41 41	2507	74 0 38	2524
	Jupiter E.	88 54 37	2102	87 3 41	2109	85 12 56	2117	83 22 23	2126
	$\alpha$ Pegasi E.	99 55 10	2219	98 7 11	2225	96 19 20	2228	94 31 40	2230
	Mars E.	104 6 46	2306	102 20 56	2313	100 35 16	2322	98 49 48	2331
5	Regulus W.	119 9 53	2149	120 59 38	2161	122 49 4	2174	124 38 11	2187
	Spica W.	65 6 23	2147	66 56 11	2159	68 45 41	2171	70 34 52	2184
	Antares W.	19 19 8	2142	21 9 3	2154	22 58 40	2167	24 47 58	2179
	Fomalhaut E.	65 42 0	2635	64 3 52	2663	62 26 22	2693	60 49 32	2725
	Jupiter E.	74 13 21	2180	72 24 23	2192	70 35 44	2206	68 47 25	2219
	$\alpha$ Pegasi E.	85 36 39	2293	83 50 29	2306	82 4 38	2320	80 19 8	2335
	Mars E.	90 6 5	2386	88 22 10	2398	86 38 33	2412	84 55 16	2426
	Saturn E.	106 3 47	2691	104 15 21	2713	102 27 13	2725	100 39 23	2739
6	Spica W.	79 35 37	2257	81 22 40	2273	83 9 19	2289	84 55 35	2306
	Antares W.	33 49 23	2252	35 36 34	2268	37 23 21	2284	39 9 44	2300
	Fomalhaut E.	52 57 16	2299	51 25 34	2300	49 54 56	2304	48 25 26	2303
	Jupiter E.	59 51 10	2296	58 5 4	2313	56 19 23	2322	54 34 6	2347
	$\alpha$ Pegasi E.	71 37 25	2422	69 54 21	2442	68 11 46	2462	66 29 40	2484
	Mars E.	76 24 8	2506	74 43 3	2523	73 2 22	2540	71 22 5	2559
	Saturn E.	91 45 18	2311	89 59 35	2327	88 14 15	2343	86 29 18	2359
	$\alpha$ Arietis E.	114 1 3	2270	112 14 19	2285	110 27 57	2300	108 41 58	2317
7	Spica W.	93 40 42	2392	95 24 28	2410	97 7 48	2429	98 50 42	2447
	Antares W.	47 55 33	2387	49 39 27	2405	51 22 55	2423	53 5 57	2441
	Fomalhaut E.	41 17 53	2479	39 57 5	2579	38 38 8	2690	37 21 10	2814
	Jupiter E.	45 54 15	2441	44 11 39	2461	42 20 31	2481	40 47 51	2509
	$\alpha$ Pegasi E.	58 7 2	2604	56 28 12	2631	54 49 59	2658	53 12 23	2687
	Mars E.	63 7 9	2655	61 29 29	2676	59 52 17	2696	58 15 32	2716
	Saturn E.	77 50 47	2440	76 8 22	2467	74 26 23	2486	72 44 50	2505
	$\alpha$ Arietis E.	99 58 6	2402	98 14 34	2419	96 31 27	2438	94 48 46	2456



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
8	Antares	W.	61° 34' 44"	9539	63° 15' 13"	9651	64° 55' 16"	9549	66° 34' 54"	9597
	Jupiter	E.	32 26 56	9613	30 48 19	9637	29 10 14	9602	27 32 43	9606
	α Pegasi	E.	45 14 38	9653	43 41 19	9692	42 8 50	9633	40 37 13	9676
	Mars	E.	50 18 45	9685	48 44 49	9646	47 11 21	9609	45 38 22	9692
	Saturn	E.	64 23 47	9692	62 44 55	9692	61 6 30	9642	59 28 32	9692
	α Arietis	E.	86 21 47	9548	84 41 40	9566	83 1 58	9584	81 22 41	9603
9	Sun	E.	127 49 9	9605	126 16 5	9684	124 43 25	9603	123 11 10	9692
	Antares	W.	74 46 54	9676	76 24 6	9693	78 0 55	9710	79 37 22	9736
	Mars	E.	38 0 48	3009	36 30 47	3034	35 1 17	3060	33 32 18	3087
	Saturn	E.	51 25 25	9763	49 50 8	9792	48 15 17	9803	46 40 53	9894
	α Arietis	E.	73 12 30	9692	71 35 39	9710	69 59 12	9736	68 23 9	9745
	Sun	E.	115 35 54	3016	114 6 1	3034	112 36 31	3052	111 7 23	3070
10	Antares	W.	87 34 11	9606	89 8 31	9691	90 42 31	9635	92 16 13	9650
	α Aquilæ	W.	42 20 54	4306	43 27 39	4337	44 35 30	4174	45 44 21	4118
	Saturn	E.	38 55 34	9699	37 23 52	9651	35 52 38	9673	34 21 52	9697
	α Arietis	E.	60 28 26	9697	58 54 33	9649	57 21 0	9658	55 47 47	9673
	Sun	E.	103 47 4	3155	102 20 1	3171	100 53 17	3188	99 26 53	3203
11	Antares	W.	100 0 16	9916	101 32 15	9998	103 3 59	9939	104 35 29	9949
	α Aquilæ	W.	51 40 19	3918	52 53 21	3959	54 6 52	3964	55 20 48	3941
	α Arietis	E.	48 6 23	9944	46 35 0	9957	45 3 54	9970	43 33 4	9983
	Sun	E.	92 19 12	3972	90 54 28	3985	89 29 59	3998	88 5 45	3999
12	α Aquilæ	W.	61 35 35	3758	62 51 21	3746	64 7 19	3736	65 23 28	3736
	Jupiter	W.	18 48 13	3163	20 15 6	3153	21 42 12	3145	23 9 27	3146
	α Arietis	E.	36 2 49	3045	34 33 32	3056	33 4 29	3069	31 35 41	3099
	Sun	E.	81 7 48	3361	79 44 47	3371	78 21 57	3379	76 59 17	3387
13	α Aquilæ	W.	71 46 32	3690	73 3 30	3694	74 20 34	3679	75 37 43	3675
	Fomalhaut	W.	47 0 50	3649	48 15 2	3617	49 29 47	3706	50 45 2	3708
	Jupiter	W.	30 26 41	3133	31 54 11	3139	33 21 42	3139	34 49 13	3139
	Sun	E.	70 8 3	3490	68 46 9	3495	67 24 21	3430	66 2 39	3435
14	α Aquilæ	W.	82 4 30	3659	83 22 1	3657	84 39 34	3655	85 57 9	3653
	Fomalhaut	W.	57 7 29	3657	58 25 2	3640	59 42 53	3694	61 1 1	3610
	Jupiter	W.	42 6 46	3139	43 34 17	3131	45 1 49	3130	46 29 22	3129
	α Pegasi	W.	34 19 15	3576	35 38 15	3543	36 57 52	3513	38 18 2	3486
	Mars	W.	21 19 9	3598	22 37 56	3563	23 57 11	3542	25 16 49	3594
	Sun	E.	59 15 8	3448	57 53 46	3450	56 32 26	3459	55 11 8	3459
15	α Aquilæ	W.	92 25 26	3649	93 43 7	3649	95 0 48	3650	96 18 28	3651
	Fomalhaut	W.	67 35 24	3546	68 54 57	3535	70 14 42	3595	71 34 38	3515
	Jupiter	W.	53 47 31	3190	55 15 16	3118	56 43 4	3114	58 10 56	3111
	α Pegasi	W.	45 5 34	3399	46 28 11	3396	47 51 6	3351	49 14 19	3337
	Mars	W.	31 59 20	3458	33 20 31	3448	34 41 53	3439	36 3 25	3431
	Saturn	W.	22 43 18	3345	24 6 37	3317	25 30 29	3293	26 54 49	3271
16	Sun	E.	48 24 37	3450	47 3 17	3448	45 41 55	3446	44 20 30	3443
	Fomalhaut	W.	78 17 0	3470	79 37 58	3469	80 59 5	3454	82 20 20	3446
	Jupiter	W.	65 31 21	3091	66 59 41	3067	68 28 7	3069	69 56 39	3077
	α Pegasi	W.	56 14 19	3273	57 39 2	3269	59 3 58	3251	60 29 7	3241

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
8	Antares W.	68 14 7	9604	69 52 56	9693	71 31 20	9641	73 9 19	9659
	Jupiter E.	25 55 47	9716	24 19 28	9745	22 43 48	9778	21 8 51	9815
	α Pegasi E.	39 6 30	3029	37 36 45	3073	36 8 3	3129	34 40 28	3186
	Mars E.	44 5 53	9615	42 33 53	9638	41 2 22	9661	39 31 20	9685
	Saturn E.	57 51 1	9689	56 13 57	9702	54 37 20	9729	53 1 9	9749
	α Arietis E.	79 43 50	9691	78 5 24	9639	76 27 22	9657	74 49 44	9675
	Sun E.	121 39 19	9941	120 7 52	9960	118 36 49	9979	117 6 10	9997
9	Antares W.	81 13 27	9743	82 49 10	9759	84 24 31	9775	85 59 31	9791
	Mars E.	32 3 52	3114	30 35 59	3149	29 8 40	3179	27 41 57	3204
	Saturn E.	45 6 56	9644	43 33 25	9685	42 0 21	9688	40 27 44	9697
	α Arietis E.	66 47 29	9769	65 12 11	9779	63 37 15	9796	62 2 40	9811
	Sun E.	109 38 37	3068	108 10 13	3105	106 42 10	3129	105 14 27	3138
10	Antares W.	93 49 36	9864	95 22 41	9877	96 55 29	9890	98 28 1	9908
	α Aquilæ W.	46 54 5	4068	48 4 38	4094	49 15 54	3984	50 27 49	3949
	Saturn E.	32 51 35	3099	31 21 49	3047	29 52 35	3075	28 23 55	3104
	α Arietis E.	54 14 53	9687	52 42 18	9699	51 10 2	9616	49 38 4	9630
	Sun E.	98 0 47	3217	96 34 58	3231	95 9 26	3246	93 44 11	3259
11	Antares W.	106 6 46	9960	107 37 49	9970	109 8 39	9980	110 39 17	9989
	α Aquilæ W.	56 35 8	3821	57 49 48	3803	59 4 47	3787	60 20 3	3771
	α Arietis E.	42 2 30	9996	40 32 12	3006	39 2 9	3090	37 32 21	3033
	Sun E.	86 41 44	3390	85 17 56	3339	83 54 21	3343	82 30 59	3359
12	α Aquilæ W.	66 39 48	3717	67 56 17	3709	69 12 55	3702	70 29 40	3695
	Jupiter W.	24 36 48	3137	26 4 13	3134	27 31 41	3133	28 59 11	3133
	α Arietis E.	30 7 9	3094	28 38 52	3107	27 10 51	3190	25 43 6	3135
	Sun E.	75 36 46	3395	74 14 24	3402	72 52 10	3408	71 30 3	3415
13	α Aquilæ W.	76 54 57	3671	78 12 15	3667	79 29 37	3664	80 47 2	3662
	Fomalhaut W.	52 0 44	3738	53 16 51	3715	54 33 22	3694	55 50 15	3675
	Jupiter W.	36 16 44	3139	37 44 15	3133	39 11 45	3133	40 39 15	3132
	Sun E.	64 41 2	3436	63 19 29	3441	61 57 59	3444	60 36 32	3446
14	α Aquilæ W.	87 14 46	3659	88 32 24	3650	89 50 4	3649	91 7 45	3649
	Fomalhaut W.	62 19 24	3597	63 38 2	3583	64 56 55	3599	66 16 3	3557
	Jupiter W.	47 56 56	3199	49 24 31	3197	50 52 8	3194	52 19 48	3192
	α Pegasi W.	39 38 42	3492	40 59 49	3439	42 21 21	3418	43 43 17	3400
	Mars W.	26 36 47	3507	27 57 3	3493	29 17 35	3480	30 38 21	3469
	Sun E.	53 49 50	3459	52 28 32	3459	51 7 14	3452	49 45 56	3451
15	α Aquilæ W.	97 36 7	3659	98 53 45	3654	100 11 21	3657	101 28 54	3659
	Fomalhaut W.	72 54 46	3505	74 15 5	3496	75 35 34	3488	76 56 12	3479
	Jupiter W.	59 38 52	3108	61 6 52	3104	62 34 57	3101	64 3 6	3096
	α Pegasi W.	50 37 48	3393	52 1 33	3310	53 25 33	3396	54 49 49	3324
	Mars W.	37 25 7	3493	38 46 59	3413	40 9 1	3405	41 31 12	3397
	Saturn W.	28 19 34	3353	29 44 41	3336	31 10 8	3321	32 35 52	3307
	Sun E.	42 59 2	3441	41 37 32	3438	40 15 59	3435	38 54 22	3431
16	Fomalhaut W.	83 41 44	3439	85 3 16	3439	86 24 56	3426	87 46 43	3420
	Jupiter W.	71 25 17	3071	72 54 2	3065	74 22 54	3060	75 51 53	3064
	α Pegasi W.	61 54 28	3230	63 20 2	3220	64 45 48	3209	66 11 46	3200

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
16	Mars W.	42 53 32	3389	44 16 1	3381	45 38 39	3374	47 1 25	3366
	Saturn W.	34 1 53	3193	35 28 10	3181	36 54 42	3170	38 21 27	3159
	Sun E.	37 32 41	3498	36 10 56	3494	34 49 7	3490	33 27 13	3416
17	Jupiter W.	77 20 59	3047	78 50 13	3041	80 19 35	3035	81 49 4	3028
	Mars W.	53 57 32	3396	55 21 13	3319	56 45 3	3310	58 9 3	3302
	Saturn W.	45 38 24	3109	47 6 23	3099	48 34 34	3090	50 2 56	3080
	Sun E.	26 36 29	3393	25 14 5	3388	23 51 35	3384	22 29 0	3380
21	Sun W.	19 3 43	3134	20 31 11	3130	21 58 56	3108	23 26 56	3096
	Spica E.	93 26 14	2771	91 51 8	2763	90 15 51	2753	88 40 22	2744
22	Sun W.	30 50 32	3040	32 19 55	3029	33 49 32	3018	35 19 23	3007
	Spica E.	80 40 2	2701	79 3 23	2692	77 26 32	2684	75 49 30	2675
23	Sun W.	42 51 49	2956	44 22 57	2946	45 54 18	2935	47 25 52	2926
	Spica E.	67 41 20	2630	66 3 6	2621	64 24 40	2612	62 46 2	2604
	Antares E.	113 24 39	2693	111 46 15	2613	110 7 38	2604	108 28 49	2595
24	Sun W.	55 6 55	2874	56 39 47	2864	58 12 52	2854	59 46 10	2843
	Spica E.	54 29 49	2559	52 49 58	2550	51 9 54	2541	49 29 38	2532
	Antares E.	100 11 35	2549	98 31 30	2540	96 51 12	2530	95 10 41	2520
25	Sun W.	67 36 4	2791	69 10 44	2781	70 45 37	2770	72 20 44	2760
	Venus W.	23 55 12	2822	25 27 54	2806	27 0 57	2850	28 34 20	2835
	Spica E.	41 5 17	2489	39 23 48	2481	37 42 8	2473	36 0 17	2465
	Antares E.	86 44 46	2473	85 2 55	2464	83 20 51	2454	81 38 33	2445
26	Sun W.	80 19 44	2707	81 56 14	2697	83 32 58	2687	85 9 56	2677
	Venus W.	36 25 46	2769	38 0 55	2756	39 36 20	2745	41 12 0	2734
	Regulus W.	27 2 48	2430	28 45 40	2417	30 28 51	2404	32 12 20	2391
	Antares E.	73 3 39	2396	71 19 59	2387	69 36 5	2377	67 51 57	2367
27	Sun W.	93 18 10	2628	94 56 30	2615	96 35 4	2606	98 13 51	2596
	Venus W.	49 14 12	2678	50 51 24	2666	52 28 50	2655	54 6 30	2645
	Regulus W.	40 53 56	2337	42 39 2	2326	44 24 23	2316	46 9 59	2307
	Antares E.	59 7 52	2391	57 22 23	2311	55 36 40	2302	53 50 44	2293
28	Sun W.	106 31 0	2561	108 11 3	2541	109 51 19	2532	111 31 46	2525
	Venus W.	62 18 18	2595	63 57 20	2586	65 36 34	2577	67 16 0	2569
	Regulus W.	55 1 28	2360	56 48 26	2352	58 35 36	2344	60 22 58	2336
	Antares E.	44 57 48	2250	43 10 35	2243	41 23 11	2235	39 35 35	2227
	$\alpha$ Aquilæ E.	98 46 28	2632	97 12 42	2619	95 38 39	2608	94 4 21	2598
29	Sun W.	119 56 47	2468	121 38 17	2458	123 19 56	2445	125 1 44	2430
	Venus W.	75 36 2	2530	77 16 34	2523	78 57 15	2517	80 38 5	2510
	Regulus W.	69 22 40	2200	71 11 8	2194	72 59 45	2188	74 48 31	2182
	Antares E.	30 34 53	2123	28 46 15	2107	26 57 28	2102	25 8 33	2177
	$\alpha$ Aquilæ E.	86 10 5	2766	84 34 52	2762	82 59 35	2761	81 24 16	2761
30	Venus W.	89 4 11	2467	90 45 43	2462	92 27 20	2459	94 9 1	2478
	Regulus W.	83 54 13	2109	85 43 41	2127	87 33 13	2155	89 22 48	2153
	$\alpha$ Aquilæ E.	73 28 27	2767	71 53 42	2777	70 19 16	2809	68 44 54	2894





## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
Tues.	1	<sup>h</sup> 6 <sup>m</sup> 40 <sup>s</sup> 10.94	10.339	N. 23° 8' 3.6"	- 9.92	15' 46.17"	68.80	<sup>m</sup> 3 <sup>s</sup> 30.12	0.461
Wed.	2	6 44 18.95	10.328	23 3 53.4	10.93	15 46.17	68.76	3 41.54	0.470
Thur.	3	6 48 26.69	10.316	22 59 19.0	11.93	15 46.17	68.72	3 52.70	0.458
Frid.	4	6 52 34.15	10.304	22 54 20.6	12.93	15 46.17	68.68	4 3.57	0.445
Sat.	5	6 56 41.30	10.291	22 48 58.2	13.92	15 46.18	68.63	4 14.13	0.432
Sun.	6	7 0 48.11	10.277	22 43 12.0	14.91	15 46.19	68.58	4 24.35	0.418
Mon.	7	7 4 54.59	10.262	22 37 2.2	15.89	15 46.21	68.53	4 34.24	0.404
Tues.	8	7 9 0.71	10.247	22 30 28.9	16.87	15 46.23	68.48	4 43.77	0.389
Wed.	9	7 13 6.44	10.231	22 23 32.2	17.84	15 46.25	68.42	4 52.93	0.373
Thur.	10	7 17 11.78	10.214	22 16 12.2	18.80	15 46.27	68.36	5 1.69	0.356
Frid.	11	7 21 16.72	10.197	22 8 29.2	19.76	15 46.30	68.30	5 10.04	0.339
Sat.	12	7 25 21.24	10.179	22 0 23.2	20.71	15 46.33	68.24	5 17.99	0.321
Sun.	13	7 29 25.33	10.161	21 51 54.5	21.66	15 46.37	68.17	5 25.50	0.303
Mon.	14	7 33 28.97	10.142	21 43 3.4	22.59	15 46.41	68.11	5 32.56	0.284
Tues.	15	7 37 32.14	10.122	21 33 49.9	23.52	15 46.46	68.04	5 39.16	0.265
Wed.	16	7 41 34.81	10.102	21 24 14.1	24.43	15 46.51	67.97	5 45.26	0.244
Thur.	17	7 45 36.99	10.081	21 14 16.5	25.34	15 46.57	67.90	5 50.87	0.223
Frid.	18	7 49 38.65	10.058	21 3 57.3	26.24	15 46.63	67.83	5 55.95	0.201
Sat.	19	7 53 39.77	10.035	20 53 16.6	27.13	15 46.70	67.75	6 0.50	0.179
Sun.	20	7 57 40.35	10.012	20 42 14.8	28.00	15 46.78	67.67	6 4.51	0.156
Mon.	21	8 1 40.37	9.988	20 30 52.2	28.87	15 46.86	67.59	6 7.96	0.132
Tues.	22	8 5 39.82	9.964	20 19 8.9	29.72	15 46.94	67.51	6 10.85	0.108
Wed.	23	8 9 38.68	9.939	20 7 5.2	30.57	15 47.03	67.43	6 13.15	0.083
Thur.	24	8 13 36.94	9.914	19 54 41.3	31.41	15 47.13	67.35	6 14.84	0.059
Frid.	25	8 17 34.60	9.889	19 41 57.6	32.23	15 47.23	67.26	6 15.94	0.034
Sat.	26	8 21 31.65	9.864	19 28 54.3	33.04	15 47.33	67.18	6 16.43	0.008
Sun.	27	8 25 28.09	9.838	19 15 31.8	33.83	15 47.44	67.09	6 16.31	0.018
Mon.	28	8 29 23.90	9.812	19 1 50.3	34.61	15 47.56	67.01	6 15.57	0.044
Tues.	29	8 33 19.10	9.787	18 47 49.9	35.39	15 47.68	66.92	6 14.22	0.069
Wed.	30	8 37 13.69	9.761	18 33 31.2	36.15	15 47.80	66.84	6 12.26	0.095
Thur.	31	8 41 7.66	9.736	18 18 54.3	36.91	15 47.92	66.75	6 9.68	0.120
Frid.	32	8 45 1.02	9.711	N. 18 3 59.3	-37.65	15 48.05	66.67	6 6.49	0.146

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.19 from the Sideral Time.

— prefixed to the hourly change of declination indicates that north declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup> <sup>s</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>
Tues.	1	6 40 10.34	10.338	N.23 8 4.2	- 9.92	3 30.09	0.481	6 36 40.25
Wed.	2	6 44 18.32	10.327	23 3 54.1	10.93	3 41.51	0.470	6 40 36.81
Thur.	3	6 48 26.03	10.315	22 59 19.8	11.93	3 52.67	0.458	6 44 33.36
Frid.	4	6 52 33.46	10.303	22 54 21.5	12.93	4 3.54	0.445	6 48 29.92
Sat.	5	6 56 40.58	10.290	22 48 59.2	13.92	4 14.10	0.432	6 52 26.48
Sun.	6	7 0 47.36	10.276	22 43 13.2	14.91	4 24.32	0.418	6 56 23.04
Mon.	7	7 4 53.81	10.261	22 37 3.5	15.89	4 34.21	0.404	7 0 19.60
Tues.	8	7 8 59.90	10.246	22 30 30.3	16.87	4 43.74	0.390	7 4 16.16
Wed.	9	7 13 5.61	10.230	22 23 33.7	17.84	4 52.90	0.373	7 8 12.71
Thur.	10	7 17 10.93	10.213	22 16 13.8	18.80	5 1.66	0.356	7 12 9.27
Frid.	11	7 21 15.84	10.196	22 8 30.9	19.76	5 10.01	0.339	7 16 5.83
Sat.	12	7 25 20.35	10.178	22 0 25.1	20.71	5 17.96	0.321	7 20 2.39
Sun.	13	7 29 24.42	10.160	21 51 56.5	21.66	5 25.47	0.303	7 23 58.95
Mon.	14	7 33 28.04	10.141	21 43 5.5	22.59	5 32.53	0.284	7 27 55.51
Tues.	15	7 37 31.19	10.121	21 33 52.1	23.52	5 39.13	0.265	7 31 52.06
Wed.	16	7 41 33.85	10.101	21 24 16.4	24.43	5 45.23	0.244	7 35 48.62
Thur.	17	7 45 36.02	10.080	21 14 19.0	25.34	5 50.85	0.223	7 39 45.17
Frid.	18	7 49 37.66	10.058	21 3 59.9	26.24	5 55.93	0.201	7 43 41.73
Sat.	19	7 53 38.77	10.035	20 53 19.3	27.13	6 0.48	0.179	7 47 38.29
Sun.	20	7 57 39.34	10.012	20 42 17.6	28.00	6 4.49	0.156	7 51 34.85
Mon.	21	8 1 39.35	9.988	20 30 55.1	28.87	6 7.95	0.132	7 55 31.40
Tues.	22	8 5 38.79	9.964	20 19 11.9	29.72	6 10.83	0.108	7 59 27.96
Wed.	23	8 9 37.65	9.939	20 7 8.3	30.57	6 13.13	0.083	8 3 24.52
Thur.	24	8 13 35.91	9.914	19 54 44.6	31.41	6 14.83	0.059	8 7 21.08
Frid.	25	8 17 33.57	9.889	19 42 1.0	32.23	6 15.94	0.034	8 11 17.63
Sat.	26	8 21 30.62	9.864	19 28 57.9	33.04	6 16.43	0.008	8 15 14.19
Sun.	27	8 25 27.06	9.838	19 15 35.4	33.83	6 16.32	0.018	8 19 10.74
Mon.	28	8 29 22.88	9.812	19 1 53.9	34.61	6 15.58	0.044	8 23 7.30
Tues.	29	8 33 18.09	9.787	18 47 53.6	35.39	6 14.23	0.069	8 27 3.86
Wed.	30	8 37 12.69	9.761	18 33 35.0	36.15	6 12.27	0.095	8 31 0.42
Thur.	31	8 41 6.67	9.736	18 18 58.1	36.91	6 9.70	0.120	8 34 56.97
Frid.	32	8 45 0.04	9.711	N.18 4 3.1	-37.65	6 6.51	0.146	8 38 53.53

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

—prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 hour.  
+ 9<sup>h</sup>.8565  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal $^{\circ}$ .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	182	99° 14' 1.4	13° 20.6	142.95	—0.08	0.0072029	+ 0.9	17 20 28.83	
2	183	100 11 12.2	10 31.2	142.95	+0.02	.0072043	+ 0.2	17 16 32.91	
3	184	101 8 22.8	7 41.6	142.94	0.14	.0072042	— 0.4	17 12 37.00	
4	185	102 5 33.3	4 51.9	142.94	0.28	.0072026	1.0	17 8 41.09	
5	186	103 2 44.0	2 2.4	142.95	0.42	.0071995	1.6	17 4 45.18	
6	187	103 59 54.9	59 13.1	142.95	0.55	.0071949	2.2	17 0 49.26	
7	188	104 57 5.9	56 24.0	142.96	0.68	.0071888	2.9	16 56 53.35	
8	189	105 54 17.3	53 35.2	142.97	0.78	.0071811	3.5	16 52 57.44	
9	190	106 51 29.0	50 46.7	142.99	0.88	.0071717	4.2	16 49 1.53	
10	191	107 48 41.1	47 58.6	143.01	0.94	.0071606	4.9	16 45 5.61	
11	192	108 45 53.7	45 11.0	143.04	0.98	.0071478	5.7	16 41 9.70	
12	193	109 43 6.9	42 24.0	143.06	0.98	.0071330	6.7	16 37 13.79	
13	194	110 40 20.7	39 37.6	143.09	0.94	.0071160	7.7	16 33 17.88	
14	195	111 37 35.1	36 51.9	143.11	0.88	.0070965	8.7	16 29 21.97	
15	196	112 34 50.2	34 6.8	143.14	0.81	.0070747	9.6	16 25 26.06	
16	197	113 32 5.8	31 22.2	143.16	0.70	.0070505	10.6	16 21 30.15	
17	198	114 29 21.9	28 38.1	143.18	0.58	.0070238	11.7	16 17 34.24	
18	199	115 26 38.5	25 54.5	143.20	0.45	.0069945	12.7	16 13 38.32	
19	200	116 23 55.7	23 11.5	143.22	0.32	.0069627	13.8	16 9 42.41	
20	201	117 21 13.3	20 29.0	143.24	0.18	.0069283	14.8	16 5 46.50	
21	202	118 18 31.4	17 46.9	143.27	+0.07	.0068914	15.9	16 1 50.59	
22	203	119 15 50.1	15 5.4	143.29	—0.03	.0068520	16.9	15 57 54.67	
23	204	120 13 9.2	12 24.4	143.30	0.10	.0068102	18.0	15 53 58.76	
24	205	121 10 28.6	9 43.7	143.32	0.15	.0067660	18.9	15 50 2.85	
25	206	122 7 48.4	7 3.3	143.33	0.17	.0067196	19.8	15 46 6.94	
26	207	123 5 8.7	4 23.4	143.35	0.16	.0066713	20.6	15 42 11.03	
27	208	124 2 29.4	1 44.0	143.38	0.13	.0066210	21.3	15 38 15.12	
28	209	124 59 50.7	59 5.1	143.40	—0.05	.0065689	22.0	15 34 19.21	
29	210	125 57 12.5	56 26.8	143.42	+0.04	.0065152	22.7	15 30 23.30	
30	211	126 54 34.9	53 49.0	143.45	0.16	.0064600	23.3	15 26 27.39	
31	212	127 51 58.0	51 11.9	143.48	0.28	.0064034	23.8	15 22 31.48	
32	213	128 49 21.9	48 35.6	143.51	+0.41	0.0063456	—24.3	15 18 35.57	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>h</sup> .0.									Diff. for 1 hour. — 9 <sup>h</sup> .829 <sup>m</sup> (Table II.)

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>d</sup>	
1	16 25.2	16 24.8	60 9.3	-0.15	60 5.9	-0.42	10 5.2	2.66	11.7	
2	16 22.5	16 19.8	59 59.2	0.70	59 49.2	0.96	11 8.9	2.62	12.7	
3	16 16.3	16 11.9	59 36.2	1.20	59 20.3	1.43	12 10.5	2.48	13.7	
4	16 6.9	16 1.3	59 1.8	1.63	58 41.2	1.79	13 8.1	2.29	14.7	
5	15 55.2	15 48.8	58 18.9	1.91	57 55.4	1.99	14 0.8	2.09	15.7	
6	15 42.2	15 35.6	57 31.2	2.02	57 6.9	2.01	14 49.1	1.93	16.7	
7	15 29.0	15 22.7	56 42.8	1.98	56 19.4	1.90	15 33.9	1.81	17.7	
8	15 16.6	15 11.0	55 57.2	1.79	55 36.6	1.65	16 16.4	1.74	18.7	
9	15 5.9	15 1.4	55 17.8	1.48	55 1.1	1.30	16 57.9	1.72	19.7	
10	14 57.4	14 54.1	54 46.6	1.10	54 34.6	0.90	17 39.5	1.75	20.7	
11	14 51.5	14 49.6	54 25.0	0.69	54 18.0	0.47	18 22.1	1.81	21.7	
12	14 48.5	14 47.9	54 13.7	-0.26	54 11.9	-0.05	19 6.6	1.90	22.7	
13	14 48.1	14 49.0	54 12.6	+0.16	54 15.7	+0.35	19 53.6	2.01	23.7	
14	14 50.5	14 52.5	54 21.0	0.53	54 28.4	0.70	20 43.1	2.12	24.7	
15	14 55.0	14 58.1	54 37.9	0.86	54 49.1	1.00	21 34.8	2.19	25.7	
16	15 1.5	15 5.4	55 1.8	1.12	55 15.8	1.21	22 27.7	2.21	26.7	
17	15 9.4	15 13.7	55 30.8	1.29	55 46.6	1.34	23 20.5	2.19	22.7	
18	15 18.2	15 22.7	56 3.0	1.37	56 19.6	1.39	6		28.7	
19	15 27.2	15 31.8	56 36.3	1.38	56 52.8	1.36	0 12.3	2.12	0.1	
20	15 36.1	15 40.4	57 8.9	1.31	57 24.4	1.27	1 2.4	2.05	1.1	
21	15 44.4	15 48.3	57 39.3	1.21	57 53.4	1.14	1 50.6	1.99	2.1	
22	15 51.9	15 55.3	58 6.7	1.07	58 19.2	0.99	2 38.3	1.96	3.1	
23	15 58.4	16 1.2	58 30.5	0.91	58 40.9	0.82	3 25.4	1.98	4.1	
24	16 3.7	16 6.1	58 50.3	0.74	58 58.7	0.66	4 13.5	2.05	5.1	
25	16 8.1	16 9.7	59 6.0	0.57	59 12.3	0.47	5 3.6	2.16	6.1	
26	16 11.1	16 12.2	59 17.4	0.37	59 21.3	0.27	5 56.8	2.30	7.1	
27	16 13.0	16 13.3	59 24.0	+0.16	59 25.2	+0.04	6 53.7	2.45	8.1	
28	16 13.2	16 12.6	59 24.8	-0.10	59 22.8	-0.24	7 53.7	2.55	9.1	
29	16 11.6	16 10.0	59 19.0	0.39	59 13.3	0.55	8 55.5	2.58	10.1	
30	16 8.0	16 5.4	59 5.7	0.72	58 56.1	0.88	9 56.6	2.50	11.1	
31	16 2.2	15 58.5	58 44.5	1.04	58 31.0	1.19	10 55.0	2.35	12.1	
32	15 54.4	15 49.8	58 15.9	-1.33	57 59.2	-1.44	11 49.3	2.17	13.1	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 1.					THURSDAY 3.				
0	16 16 19.43	2.6845	S. 25° 17' 59.2"	4.174	0	18 25 28.60	2.6997	S. 25° 2' 49.2"	4.707
1	16 19 0.59	2.6874	25 22 4.2	3.991	1	18 28 6.23	2.6946	24 58 1.6	4.878
2	16 21 41.92	2.6908	25 25 58.1	3.807	2	18 30 43.55	2.6193	24 53 3.6	5.047
3	16 24 23.41	2.6938	25 29 41.0	3.622	3	18 33 20.54	2.6138	24 47 56.0	5.214
4	16 27 5.06	2.6953	25 33 12.8	3.438	4	18 35 57.20	2.6083	24 42 38.2	5.380
5	16 29 46.85	2.6976	25 36 33.5	3.253	5	18 38 33.53	2.6026	24 37 10.4	5.546
6	16 32 28.77	2.6997	25 39 43.1	3.067	6	18 41 9.51	2.5967	24 31 32.7	5.709
7	16 35 10.81	2.7017	25 42 41.5	2.879	7	18 43 45.14	2.5908	24 25 45.3	5.871
8	16 37 52.97	2.7035	25 45 28.6	2.692	8	18 46 20.41	2.5848	24 19 48.2	6.031
9	16 40 35.23	2.7051	25 48 4.5	2.504	9	18 48 55.32	2.5787	24 13 41.6	6.189
10	16 43 17.58	2.7065	25 50 29.1	2.316	10	18 51 29.86	2.5725	24 7 25.5	6.347
11	16 46 0.01	2.7078	25 52 42.4	2.127	11	18 54 4.02	2.5662	24 1 0.0	6.503
12	16 48 42.52	2.7090	25 54 44.3	1.937	12	18 56 37.80	2.5598	23 54 25.2	6.657
13	16 51 25.09	2.7098	25 56 34.9	1.748	13	18 59 11.19	2.5533	23 47 41.2	6.809
14	16 54 7.70	2.7105	25 58 14.1	1.558	14	19 1 44.19	2.5466	23 40 48.1	6.961
15	16 56 50.35	2.7111	25 59 41.3	1.369	15	19 4 16.78	2.5398	23 33 45.9	7.111
16	16 59 33.03	2.7115	26 0 58.4	1.179	16	19 6 48.97	2.5331	23 26 34.8	7.258
17	17 2 15.73	2.7117	26 2 3.4	0.988	17	19 9 20.75	2.5263	23 19 14.9	7.405
18	17 4 58.43	2.7117	26 2 57.0	0.798	18	19 11 52.12	2.5193	23 11 46.2	7.550
19	17 7 41.13	2.7115	26 3 39.2	0.608	19	19 14 23.07	2.5123	23 4 8.9	7.692
20	17 10 23.81	2.7111	26 4 10.0	0.418	20	19 16 53.60	2.5053	22 56 23.1	7.833
21	17 13 6.46	2.7105	26 4 29.4	0.228	21	19 19 23.71	2.4982	22 48 28.9	7.973
22	17 15 49.07	2.7098	26 4 37.4	-0.038	22	19 21 53.38	2.4909	22 40 26.3	8.112
23	17 18 31.63	2.7089	S. 26° 4' 34.0"	+0.151	23	19 24 22.62	2.4837	S. 22° 32' 15.5"	8.248
WEDNESDAY 2.					FRIDAY 4.				
0	17 21 14.14	2.7078	S. 26° 4' 19.3"	0.340	0	19 26 51.43	2.4765	S. 22° 23' 56.6"	8.388
1	17 23 56.57	2.7065	26 3 53.2	0.530	1	19 29 19.80	2.4691	22 15 29.7	8.514
2	17 26 38.92	2.7051	26 3 15.7	0.719	2	19 31 47.72	2.4617	22 6 54.9	8.646
3	17 29 21.18	2.7034	26 2 26.9	0.907	3	19 34 15.20	2.4542	21 58 12.2	8.776
4	17 32 3.33	2.7016	26 1 26.8	1.096	4	19 36 42.23	2.4467	21 49 21.8	8.903
5	17 34 45.37	2.6996	26 0 15.4	1.284	5	19 39 8.81	2.4393	21 40 23.9	9.028
6	17 37 27.28	2.6974	25 58 52.7	1.472	6	19 41 34.95	2.4318	21 31 18.5	9.152
7	17 40 9.06	2.6951	25 57 18.8	1.658	7	19 44 0.63	2.4243	21 22 5.7	9.274
8	17 42 50.69	2.6925	25 55 33.8	1.843	8	19 46 25.86	2.4167	21 12 45.6	9.394
9	17 45 32.16	2.6898	25 53 37.6	2.029	9	19 48 50.63	2.4090	21 3 18.4	9.513
10	17 48 13.46	2.6869	25 51 30.3	2.214	10	19 51 14.94	2.4013	20 53 44.1	9.630
11	17 50 54.59	2.6839	25 49 11.9	2.398	11	19 53 38.79	2.3937	20 44 2.8	9.745
12	17 53 35.53	2.6807	25 46 42.5	2.582	12	19 56 2.19	2.3862	20 34 14.7	9.858
13	17 56 16.27	2.6773	25 44 2.1	2.764	13	19 58 25.13	2.3785	20 24 19.9	9.969
14	17 58 56.80	2.6738	25 41 10.8	2.946	14	20 0 47.61	2.3707	20 14 18.4	10.079
15	18 1 37.12	2.6701	25 38 8.6	3.127	15	20 3 9.62	2.3630	20 4 10.4	10.187
16	18 4 17.21	2.6663	25 34 55.6	3.306	16	20 5 31.17	2.3554	19 53 56.0	10.293
17	18 6 57.06	2.6621	25 31 31.9	3.485	17	20 7 52.27	2.3478	19 43 35.3	10.397
18	18 9 36.66	2.6579	25 27 57.4	3.663	18	20 10 12.91	2.3401	19 33 8.4	10.499
19	18 12 16.01	2.6536	25 24 12.3	3.840	19	20 12 33.08	2.3324	19 22 35.4	10.600
20	18 14 55.09	2.6491	25 20 16.6	4.017	20	20 14 52.80	2.3248	19 11 56.4	10.699
21	18 17 33.90	2.6445	25 16 10.3	4.192	21	20 17 12.06	2.3172	19 1 11.5	10.796
22	18 20 12.43	2.6397	25 11 53.6	4.365	22	20 19 30.86	2.3096	18 50 20.9	10.891
23	18 22 50.67	2.6347	25 7 26.5	4.537	23	20 21 49.21	2.3020	18 39 24.6	10.985
24	18 25 28.60	2.6297	S. 25° 2' 49.2"	4.707	24	20 24 7.10	2.2944	S. 18° 28' 22.7"	11.077

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 5.					MONDAY 7.				
0	<sup>h</sup> 20 <sup>m</sup> 24 <sup>s</sup> 7.10	2.2944	S. 18° 26' 22.7"	11.077	0	<sup>h</sup> 22 <sup>m</sup> 6 <sup>s</sup> 20.40	1.9878	S. 8° 21' 48.2"	13.638
1	20 26 24.54	2.2968	18 17 15.4	11.167	1	22 8 19.53	1.9831	8 8 9.7	13.651
2	20 28 41.52	2.2792	18 6 2.7	11.255	2	22 10 18.37	1.9783	7 54 30.1	13.669
3	20 30 58.05	2.2717	17 54 44.8	11.342	3	22 12 16.93	1.9737	7 40 49.4	13.687
4	20 33 14.13	2.2643	17 43 21.7	11.427	4	22 14 15.22	1.9693	7 27 7.7	13.703
5	20 35 29.77	2.2569	17 31 53.6	11.510	5	22 16 13.25	1.9649	7 13 25.0	13.718
6	20 37 44.96	2.2495	17 20 20.5	11.592	6	22 18 11.01	1.9605	6 59 41.5	13.732
7	20 39 59.71	2.2421	17 8 42.6	11.671	7	22 20 8.51	1.9560	6 45 57.2	13.745
8	20 42 14.01	2.2347	16 57 0.0	11.749	8	22 22 5.76	1.9516	6 32 12.1	13.758
9	20 44 27.87	2.2274	16 45 12.7	11.826	9	22 24 2.75	1.9472	6 18 26.2	13.770
10	20 46 41.30	2.2202	16 33 20.9	11.900	10	22 25 59.50	1.9428	6 4 39.7	13.779
11	20 48 54.29	2.2129	16 21 24.7	11.973	11	22 27 56.01	1.9386	5 50 52.7	13.788
12	20 51 6.85	2.2057	16 9 24.1	12.045	12	22 29 52.28	1.9359	5 37 5.2	13.796
13	20 53 18.98	2.1987	15 57 19.3	12.114	13	22 31 48.32	1.9329	5 23 17.2	13.802
14	20 55 30.69	2.1916	15 45 10.4	12.182	14	22 33 44.14	1.9285	5 9 28.9	13.807
15	20 57 41.97	2.1845	15 32 57.4	12.249	15	22 35 39.74	1.9246	4 55 40.3	13.812
16	20 59 52.83	2.1776	15 20 40.5	12.314	16	22 37 35.12	1.9212	4 41 51.4	13.817
17	21 2 3.28	2.1707	15 8 19.7	12.378	17	22 39 30.28	1.9177	4 28 2.2	13.821
18	21 4 13.31	2.1638	14 55 55.1	12.440	18	22 41 25.24	1.9143	4 14 12.9	13.823
19	21 6 22.93	2.1570	14 43 26.9	12.500	19	22 43 20.00	1.9110	4 0 23.5	13.824
20	21 8 32.15	2.1502	14 30 55.1	12.559	20	22 45 14.56	1.9077	3 46 34.0	13.824
21	21 10 40.96	2.1435	14 18 19.8	12.616	21	22 47 8.92	1.9045	3 32 44.6	13.823
22	21 12 49.37	2.1369	14 5 41.2	12.671	22	22 49 3.10	1.9014	3 18 55.3	13.821
23	21 14 57.39	2.1303	S. 13° 52' 59.3"	12.726	23	22 50 57.09	1.8983	S. 3° 5' 6.1"	13.818
SUNDAY 6.					TUESDAY 8.				
0	21 17 5.01	2.1237	S. 13° 40' 14.1"	12.779	0	22 52 50.90	1.8953	S. 2° 51' 17.1"	13.815
1	21 19 12.24	2.1173	13 27 25.8	12.830	1	22 54 44.53	1.8925	2 37 28.3	13.811
2	21 21 19.09	2.1110	13 14 34.5	12.879	2	22 56 38.00	1.8897	2 23 39.8	13.805
3	21 23 25.56	2.1047	13 1 40.3	12.927	3	22 58 31.30	1.8870	2 9 51.7	13.798
4	21 25 31.65	2.0983	12 48 43.2	12.975	4	23 0 24.44	1.8844	1 56 4.0	13.792
5	21 27 37.36	2.0921	12 35 43.3	13.020	5	23 2 17.43	1.8818	1 42 16.7	13.785
6	21 29 42.70	2.0860	12 22 40.8	13.064	6	23 4 10.26	1.8793	1 28 29.8	13.777
7	21 31 47.68	2.0800	12 9 35.7	13.107	7	23 6 2.95	1.8770	1 14 43.5	13.768
8	21 33 52.30	2.0739	11 56 28.0	13.148	8	23 7 55.50	1.8746	1 0 57.9	13.755
9	21 35 56.55	2.0679	11 43 17.9	13.188	9	23 9 47.90	1.8723	0 47 12.9	13.744
10	21 38 0.45	2.0621	11 30 5.4	13.227	10	23 11 40.17	1.8702	0 33 28.6	13.732
11	21 40 4.00	2.0563	11 16 50.7	13.263	11	23 13 32.32	1.8681	0 19 45.0	13.720
12	21 42 7.21	2.0507	11 3 33.8	13.299	12	23 15 24.34	1.8660	S. 0° 6' 2.2"	13.707
13	21 44 10.08	2.0450	10 50 14.8	13.333	13	23 17 16.24	1.8641	N. 0° 7' 39.8"	13.693
14	21 46 12.61	2.0394	10 36 53.8	13.367	14	23 19 8.63	1.8622	0 21 20.9	13.677
15	21 48 14.81	2.0339	10 23 30.8	13.399	15	23 20 59.71	1.8604	0 35 1.0	13.660
16	21 50 16.66	2.0285	10 10 5.9	13.430	16	23 22 51.28	1.8587	0 48 40.1	13.643
17	21 52 18.23	2.0232	9 56 39.2	13.459	17	23 24 42.75	1.8570	1 2 18.2	13.626
18	21 54 19.46	2.0179	9 43 10.8	13.487	18	23 26 34.12	1.8554	1 15 55.3	13.608
19	21 56 20.37	2.0127	9 29 40.7	13.514	19	23 28 25.40	1.8539	1 29 31.2	13.589
20	21 58 20.98	2.0076	9 16 9.1	13.539	20	23 30 16.59	1.8525	1 43 6.0	13.570
21	22 0 21.28	2.0025	9 2 36.0	13.563	21	23 32 7.70	1.8512	1 56 39.6	13.550
22	22 2 21.28	1.9976	8 49 1.5	13.587	22	23 33 58.73	1.8499	2 10 12.0	13.528
23	22 4 20.99	1.9927	8 35 25.5	13.611	23	23 35 49.69	1.8487	2 23 43.0	13.506
24	22 6 20.40	1.9878	S. 8° 21' 48.2"	13.633	24	23 37 40.58	1.8476	N. 2° 37' 12.7"	13.483

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 9.					FRIDAY 11.				
0	23 37 40.58	1.8476	N. 2° 37' 12.7"	13.483	0	1 6 24.05	1.8747	N. 12° 45' 33.8"	11.615
1	23 39 31.40	1.8465	2 50 41.0	13.480	1	1 8 16.60	1.8768	12 57 9.1	11.580
2	23 41 22.16	1.8456	3 4 7.9	13.437	2	1 10 9.27	1.8790	13 8 41.0	11.504
3	23 43 12.87	1.8447	3 17 33.4	13.413	3	1 12 2.08	1.8813	13 20 9.6	11.448
4	23 45 3.52	1.8438	3 30 57.4	13.387	4	1 13 55.03	1.8836	13 31 34.8	11.392
5	23 46 54.13	1.8431	3 44 19.8	13.360	5	1 15 48.11	1.8858	13 42 56.6	11.334
6	23 48 44.69	1.8423	3 57 40.6	13.333	6	1 17 41.33	1.8889	13 54 14.9	11.376
7	23 50 35.21	1.8417	4 10 59.8	13.306	7	1 19 34.70	1.8907	14 5 29.7	11.317
8	23 52 25.70	1.8412	4 24 17.3	13.278	8	1 21 28.22	1.8932	14 16 41.0	11.158
9	23 54 16.16	1.8407	4 37 33.1	13.249	9	1 23 21.89	1.8957	14 27 48.7	11.098
10	23 56 6.59	1.8403	4 50 47.2	13.219	10	1 25 15.71	1.8983	14 38 52.8	11.038
11	23 57 57.00	1.8401	5 3 59.4	13.188	11	1 27 9.69	1.9010	14 49 53.2	10.977
12	23 59 47.40	1.8398	5 17 9.8	13.158	12	1 29 3.83	1.9037	15 0 50.0	10.915
13	0 1 37.78	1.8396	5 30 18.4	13.127	13	1 30 58.14	1.9065	15 11 43.0	10.858
14	0 3 28.15	1.8395	5 43 25.0	13.094	14	1 32 52.61	1.9093	15 22 32.2	10.788
15	0 5 18.52	1.8395	5 56 29.7	13.062	15	1 34 47.25	1.9121	15 33 17.6	10.725
16	0 7 8.89	1.8395	6 9 32.4	13.028	16	1 36 42.06	1.9150	15 43 59.2	10.660
17	0 8 59.26	1.8395	6 22 33.0	12.993	17	1 38 37.05	1.9180	15 54 36.8	10.594
18	0 10 49.63	1.8396	6 35 31.6	12.959	18	1 40 32.22	1.9210	16 5 10.5	10.528
19	0 12 40.01	1.8396	6 48 28.1	12.923	19	1 42 27.57	1.9240	16 15 40.2	10.462
20	0 14 30.41	1.8402	7 1 22.4	12.887	20	1 44 23.10	1.9271	16 26 5.9	10.394
21	0 16 20.84	1.8407	7 14 14.5	12.850	21	1 46 18.82	1.9302	16 36 27.5	10.326
22	0 18 11.29	1.8411	7 27 4.4	12.812	22	1 48 14.73	1.9334	16 46 45.0	10.257
23	0 20 1.77	1.8415	N. 7° 39' 52.0"	12.774	23	1 50 10.83	1.9366	N. 16° 56' 58.3"	10.187
THURSDAY 10.					SATURDAY 12.				
0	0 21 52.27	1.8420	N. 7° 52' 37.3"	12.736	0	1 52 7.12	1.9398	N. 17° 7' 7.5"	10.117
1	0 23 42.81	1.8427	8 5 20.3	12.697	1	1 54 3.61	1.9431	17 17 12.4	10.046
2	0 25 33.39	1.8434	8 18 0.9	12.656	2	1 56 0.30	1.9464	17 27 13.0	9.975
3	0 27 24.02	1.8442	8 30 39.0	12.615	3	1 57 57.18	1.9497	17 37 9.4	9.903
4	0 29 14.69	1.8449	8 43 14.7	12.574	4	1 59 54.27	1.9532	17 47 1.4	9.830
5	0 31 5.41	1.8456	8 55 47.9	12.532	5	2 1 51.57	1.9567	17 56 49.0	9.756
6	0 32 56.19	1.8468	9 8 18.6	12.490	6	2 3 49.08	1.9602	18 6 32.1	9.682
7	0 34 47.03	1.8478	9 20 46.7	12.447	7	2 5 46.80	1.9637	18 16 10.8	9.607
8	0 36 37.93	1.8489	9 33 12.2	12.403	8	2 7 44.73	1.9673	18 25 44.9	9.530
9	0 38 28.90	1.8501	9 45 35.0	12.358	9	2 9 42.88	1.9709	18 35 14.4	9.453
10	0 40 19.94	1.8513	9 57 55.2	12.313	10	2 11 41.24	1.9745	18 44 39.3	9.376
11	0 42 11.06	1.8527	10 10 12.6	12.268	11	2 13 39.82	1.9782	18 53 59.5	9.298
12	0 44 2.26	1.8540	10 22 27.3	12.223	12	2 15 38.62	1.9818	19 3 15.1	9.220
13	0 45 53.54	1.8553	10 34 39.2	12.174	13	2 17 37.64	1.9856	19 12 25.9	9.140
14	0 47 44.90	1.8567	10 46 48.2	12.127	14	2 19 36.89	1.9894	19 21 31.9	9.060
15	0 49 36.35	1.8583	10 58 54.4	12.079	15	2 21 36.37	1.9932	19 30 33.1	8.979
16	0 51 27.90	1.8599	11 10 57.7	12.030	16	2 23 36.07	1.9969	19 39 29.4	8.897
17	0 53 19.54	1.8615	11 22 58.0	11.979	17	2 25 36.00	2.0006	19 48 20.7	8.814
18	0 55 11.28	1.8632	11 34 55.2	11.928	18	2 27 36.17	2.0047	19 57 7.1	8.732
19	0 57 3.13	1.8651	11 46 49.4	11.878	19	2 29 36.57	2.0088	20 5 48.5	8.648
20	0 58 55.09	1.8668	11 58 40.6	11.827	20	2 31 37.20	2.0124	20 14 24.8	8.563
21	1 0 47.15	1.8687	12 10 28.7	11.775	21	2 33 38.06	2.0163	20 22 56.0	8.478
22	1 2 39.33	1.8707	12 22 13.6	11.723	22	2 35 39.16	2.0203	20 31 22.1	8.392
23	1 4 31.63	1.8727	12 33 55.3	11.669	23	2 37 40.50	2.0244	20 39 43.0	8.304
24	1 6 24.05	1.8747	N. 12° 45' 33.8"	11.615	24	2 39 42.09	2.0284	N. 20° 47' 58.6"	8.217

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 13.					TUESDAY 15.				
0	2 39 42.09	2.0384	N.20° 47' 58.6"	8.917	0	4 21 42.45	2.9161	N.25° 26' 57.0"	3.198
1	2 41 43.91	2.0393	20 56 9.0	8.198	1	4 23 55.51	2.9193	25 30 0.9	3.603
2	2 43 45.97	2.0364	21 4 14.0	8.038	2	4 26 8.77	2.9296	25 32 57.4	2.879
3	2 45 48.28	2.0405	21 12 13.6	7.948	3	4 28 22.22	2.9357	25 35 46.4	2.755
4	2 47 50.83	2.0445	21 20 7.8	7.857	4	4 30 35.85	2.9398	25 38 28.0	2.631
5	2 49 53.62	2.0485	21 27 56.5	7.766	5	4 32 49.67	2.9318	25 41 2.1	2.505
6	2 51 56.65	2.0526	21 35 39.7	7.674	6	4 35 3.67	2.9348	25 43 28.6	2.379
7	2 53 59.93	2.0567	21 43 17.4	7.581	7	4 37 17.84	2.9377	25 45 47.6	2.258
8	2 56 3.46	2.0608	21 50 49.4	7.487	8	4 39 32.19	2.9406	25 47 58.9	2.135
9	2 58 7.93	2.0649	21 58 15.8	7.393	9	4 41 46.71	2.9433	25 50 2.6	1.997
10	3 0 11.25	2.0691	22 5 36.5	7.298	10	4 44 1.39	2.9460	25 51 58.6	1.869
11	3 2 15.52	2.0732	22 12 51.5	7.209	11	4 46 16.23	2.9487	25 53 46.9	1.741
12	3 4 20.03	2.0773	22 20 0.7	7.104	12	4 48 31.24	2.9514	25 55 27.5	1.619
13	3 6 24.79	2.0814	22 27 4.0	7.007	13	4 50 46.40	2.9539	25 57 0.3	1.488
14	3 8 29.80	2.0855	22 34 1.5	6.909	14	4 53 1.71	2.9563	25 58 25.3	1.358
15	3 10 35.06	2.0897	22 40 53.1	6.810	15	4 55 17.16	2.9588	25 59 42.6	1.228
16	3 12 40.56	2.0938	22 47 38.7	6.709	16	4 57 32.76	2.9612	26 0 52.0	1.091
17	3 14 46.31	2.0979	22 54 18.2	6.608	17	4 59 48.50	2.9634	26 1 53.5	0.959
18	3 16 52.31	2.1020	23 0 51.7	6.507	18	5 2 4.37	2.9658	26 2 47.1	0.828
19	3 18 58.55	2.1061	23 7 19.1	6.405	19	5 4 20.37	2.9677	26 3 32.8	0.696
20	3 21 5.04	2.1102	23 13 40.3	6.302	20	5 6 36.50	2.9698	26 4 10.6	0.563
21	3 23 11.78	2.1143	23 19 55.3	6.198	21	5 8 52.75	2.9718	26 4 40.4	0.431
22	3 25 18.76	2.1184	23 26 4.0	6.093	22	5 11 9.12	2.9737	26 5 2.3	0.297
23	3 27 25.99	2.1225	N.23 32 6.5	5.989	23	5 13 25.60	2.9756	N.26 5 16.1	0.163
MONDAY 14.					WEDNESDAY 16.				
0	3 29 33.46	2.1265	N.23 38 2.7	5.883	0	5 15 42.19	2.9774	N.26 5 21.9	+0.030
1	3 31 41.17	2.1306	23 43 52.5	5.776	1	5 17 58.89	2.9791	26 5 19.7	-0.104
2	3 33 49.13	2.1347	23 49 35.8	5.668	2	5 20 15.68	2.9807	26 5 9.4	0.239
3	3 35 57.33	2.1387	23 55 12.7	5.561	3	5 22 32.57	2.9822	26 4 51.0	0.374
4	3 38 5.77	2.1427	24 0 43.1	5.454	4	5 24 49.55	2.9837	26 4 24.5	0.509
5	3 40 14.45	2.1466	24 6 6.9	5.349	5	5 27 6.61	2.9850	26 3 49.9	0.644
6	3 42 23.36	2.1505	24 11 24.1	5.239	6	5 29 23.75	2.9863	26 3 7.2	0.780
7	3 44 32.51	2.1545	24 16 34.7	5.131	7	5 31 40.97	2.9876	26 2 16.3	0.916
8	3 46 41.90	2.1584	24 21 38.6	5.008	8	5 33 58.26	2.9887	26 1 17.3	1.051
9	3 48 51.52	2.1622	24 26 35.7	4.896	9	5 36 15.62	2.9898	26 0 10.2	1.187
10	3 51 1.37	2.1661	24 31 26.1	4.783	10	5 38 33.04	2.9908	25 58 54.9	1.323
11	3 53 11.45	2.1699	24 36 9.7	4.669	11	5 40 50.52	2.9917	25 57 31.4	1.460
12	3 55 21.76	2.1737	24 40 46.4	4.554	12	5 43 8.05	2.9928	25 55 59.7	1.597
13	3 57 32.29	2.1774	24 45 16.2	4.439	13	5 45 25.63	2.9933	25 54 19.8	1.733
14	3 59 43.05	2.1812	24 49 39.1	4.323	14	5 47 43.25	2.9940	25 52 31.7	1.870
15	4 1 54.03	2.1848	24 53 55.0	4.206	15	5 50 0.91	2.9946	25 50 35.4	2.007
16	4 4 5.23	2.1885	24 58 3.8	4.088	16	5 52 18.60	2.9951	25 48 30.9	2.143
17	4 6 16.65	2.1921	25 2 5.6	3.971	17	5 54 36.32	2.9956	25 46 18.2	2.280
18	4 8 28.28	2.1957	25 6 0.3	3.852	18	5 56 54.07	2.9960	25 43 57.3	2.417
19	4 10 40.13	2.1992	25 9 47.8	3.732	19	5 59 11.84	2.9962	25 41 28.2	2.554
20	4 12 52.18	2.2026	25 13 28.1	3.612	20	6 1 29.62	2.9964	25 38 50.8	2.692
21	4 15 4.44	2.2061	25 17 1.3	3.492	21	6 3 47.41	2.9966	25 36 5.2	2.828
22	4 17 16.91	2.2095	25 20 27.2	3.371	22	6 6 5.21	2.9968	25 33 11.4	2.965
23	4 19 29.58	2.2128	25 23 45.8	3.248	23	6 8 23.00	2.9968	25 30 9.4	3.101
24	4 21 42.45	2.2161	N.25 26 57.0	3.126	24	6 10 40.79	2.9964	N.25 26 59.3	3.237



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 17.					SATURDAY 19.				
0	h m s	"	N. 25° 26' 59.3"	3.337	0	h m s	"	N. 20° 19' 56.8"	9.358
1	6 10 40.79	2.9964	25 23 41.0	3.374	1	7 59 29.81	2.9171	20 10 31.9	9.471
2	6 12 58.57	2.9969	25 20 14.4	3.511	2	8 1 42.75	2.9144	20 1 0.2	9.583
3	6 15 16.34	2.9960	25 16 39.6	3.647	3	8 3 55.53	2.9117	19 51 21.9	9.693
4	6 17 34.09	2.9957	25 12 56.7	3.783	4	8 6 8.15	2.9089	19 41 37.0	9.809
5	6 19 51.82	2.9953	25 9 5.6	3.920	5	8 8 20.60	2.9062	19 31 45.6	9.910
6	6 22 9.52	2.9948	25 5 6.3	4.056	6	8 10 32.89	2.9035	19 21 47.8	10.018
7	6 24 27.19	2.9943	25 0 58.9	4.191	7	8 12 45.02	2.9007	19 11 43.5	10.125
8	6 26 44.82	2.9935	24 56 43.4	4.326	8	8 14 56.98	2.1979	18 51 15.8	10.235
9	6 29 2.41	2.9928	24 52 19.8	4.461	9	8 17 8.77	2.1952	18 40 52.6	10.342
10	6 31 19.96	2.9921	24 47 48.1	4.596	10	8 19 20.40	2.1924	18 30 23.2	10.449
11	6 33 37.46	2.9912	24 43 8.3	4.731	11	8 21 31.86	2.1897	18 19 47.6	10.556
12	6 35 54.90	2.9903	24 38 20.4	4.865	12	8 23 43.16	2.1869	18 9 5.9	10.664
13	6 38 12.28	2.9892	24 33 24.5	4.998	13	8 25 54.29	2.1841	17 58 18.2	10.771
14	6 40 29.60	2.9889	24 28 20.6	5.132	14	8 28 5.25	2.1813	17 47 24.5	10.878
15	6 42 46.86	2.9871	24 23 8.6	5.266	15	8 30 16.04	2.1785	17 36 24.9	10.985
16	6 45 4.05	2.9858	24 17 48.7	5.398	16	8 32 26.67	2.1757	17 25 19.5	11.092
17	6 47 21.16	2.9845	24 12 20.8	5.531	17	8 34 37.13	2.1730	17 14 8.3	11.199
18	6 49 38.19	2.9839	24 6 45.0	5.663	18	8 36 47.43	2.1702	16 51 28.7	11.306
19	6 51 55.15	2.9819	23 49 10.1	5.807	19	8 38 57.56	2.1674	16 40 0.5	11.413
20	6 54 12.02	2.9804	23 43 2.8	5.949	20	8 41 7.52	2.1647	16 28 26.7	11.520
21	6 56 28.80	2.9788	N. 23° 36' 47.7"	6.091	21	8 43 17.32	2.1620		11.627
22	6 58 45.48	2.9773		6.233	22	8 45 26.96	2.1592		11.734
23	7 1 2.07	2.9757		6.375	23	8 47 36.43	2.1565		11.841
24	7 3 18.56	2.9740		6.517	24	8 49 45.74	2.1538		11.948
FRIDAY 18.					SUNDAY 20.				
0	h m s	"	N. 23° 30' 24.8"	6.447	0	h m s	"	N. 16° 5' 2.7"	11.789
1	7 5 34.95	2.9739	23 23 54.1	6.575	1	8 51 54.89	2.1513	15 53 12.7	11.896
2	7 7 51.23	2.9704	23 17 15.8	6.703	2	8 54 3.88	2.1485	15 41 17.3	11.997
3	7 10 7.40	2.9685	23 10 29.8	6.831	3	8 56 12.71	2.1458	15 29 16.7	12.098
4	7 12 23.45	2.9666	23 3 36.1	6.958	4	8 58 21.38	2.1439	15 17 10.9	12.199
5	7 14 39.39	2.9647	22 56 34.8	7.084	5	9 0 29.90	2.1407	15 5 0.1	12.299
6	7 16 55.21	2.9627	22 49 26.0	7.210	6	9 2 38.26	2.1381	14 52 44.3	12.399
7	7 19 10.91	2.9608	22 42 9.6	7.336	7	9 4 46.47	2.1355	14 40 23.5	12.499
8	7 21 26.48	2.9588	22 34 45.7	7.460	8	9 6 54.52	2.1329	14 27 57.7	12.599
9	7 23 41.93	2.9564	22 27 14.4	7.584	9	9 9 2.42	2.1305	14 15 27.1	12.699
10	7 25 57.25	2.9542	22 19 35.6	7.708	10	9 11 10.18	2.1281	13 50 11.7	12.799
11	7 28 12.43	2.9519	22 11 49.4	7.831	11	9 13 17.79	2.1256	13 37 27.0	12.899
12	7 30 27.48	2.9497	22 3 55.9	7.953	12	9 15 25.25	2.1232	13 24 37.7	12.999
13	7 32 42.39	2.9473	21 55 55.1	8.074	13	9 17 32.57	2.1208	13 11 43.9	13.099
14	7 34 57.16	2.9450	21 47 47.0	8.195	14	9 19 39.74	2.1184	12 58 45.7	13.199
15	7 37 11.79	2.9426	21 39 31.7	8.315	15	9 21 46.78	2.1162	12 45 43.1	13.299
16	7 39 26.27	2.9401	21 31 9.2	8.434	16	9 23 53.68	2.1139	12 32 36.2	13.399
17	7 41 40.60	2.9377	21 22 39.6	8.552	17	9 26 0.45	2.1117	12 19 25.1	13.499
18	7 43 54.79	2.9352	21 14 3.0	8.669	18	9 28 7.08	2.1094	12 6 9.8	13.599
19	7 46 8.83	2.9328	20 56 26.6	8.787	19	9 30 13.58	2.1072	11 52 50.4	13.699
20	7 48 22.71	2.9301	20 47 30.9	8.903	20	9 32 19.95	2.1050	11 39 27.0	13.799
21	7 50 36.44	2.9276	20 38 26.3	9.019	21	9 34 26.20	2.1031	11 25 59.7	13.899
22	7 52 50.02	2.9250	20 29 14.9	9.133	22	9 36 32.32	2.1010	11 12 28.5	13.999
23	7 55 3.44	2.9223	N. 20° 19' 56.8"	9.258	23	9 38 38.32	2.0990		14.099
24	7 57 16.70	2.9197			24	9 40 44.20	2.0971		14.199
	7 59 29.81	2.9171				9 42 49.97	2.0952		14.299

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 21.					WEDNESDAY 23.				
0	9 42 49.97	2.0932	N. 10 58 53.4	13.616	0	11 22 16.14	2.0796	S. 0 44 23.6	15.913
1	9 44 55.62	2.0933	10 45 14.6	13.676	1	11 24 20.53	2.0737	0 59 36.5	15.916
2	9 47 1.17	2.0916	10 31 32.1	13.736	2	11 26 24.99	2.0750	1 14 49.5	15.917
3	9 49 6.61	2.0898	10 17 46.0	13.797	3	11 28 29.53	2.0763	1 30 2.6	15.917
4	9 51 11.94	2.0880	10 3 56.4	13.855	4	11 30 34.15	2.0777	1 45 15.6	15.916
5	9 53 17.17	2.0863	9 50 3.4	13.912	5	11 32 38.86	2.0793	2 0 28.5	15.913
6	9 55 22.30	2.0847	9 36 6.9	13.969	6	11 34 43.67	2.0809	2 15 41.1	15.908
7	9 57 27.34	2.0832	9 22 7.1	14.023	7	11 36 48.57	2.0826	2 30 53.4	15.903
8	9 59 32.29	2.0817	9 8 4.1	14.077	8	11 38 53.57	2.0843	2 46 5.4	15.197
9	10 1 37.14	2.0800	8 53 57.9	14.130	9	11 40 58.68	2.0861	3 1 17.0	15.188
10	10 3 41.91	2.0788	8 39 48.6	14.181	10	11 43 3.90	2.0879	3 16 28.0	15.178
11	10 5 46.60	2.0776	8 25 36.2	14.231	11	11 45 9.23	2.0898	3 31 38.4	15.168
12	10 7 51.22	2.0763	8 11 20.9	14.279	12	11 47 14.68	2.0918	3 46 48.2	15.157
13	10 9 55.76	2.0750	7 57 2.7	14.327	13	11 49 20.25	2.0939	4 1 57.2	15.143
14	10 12 0.22	2.0738	7 42 41.7	14.373	14	11 51 25.95	2.0960	4 17 5.3	15.128
15	10 14 4.61	2.0727	7 28 17.9	14.419	15	11 53 31.79	2.0984	4 32 12.5	15.119
16	10 16 8.94	2.0717	7 13 51.4	14.469	16	11 55 37.76	2.1008	4 47 18.7	15.094
17	10 18 13.21	2.0707	6 59 22.4	14.505	17	11 57 43.88	2.1032	5 2 23.8	15.075
18	10 20 17.42	2.0697	6 44 50.8	14.547	18	11 59 50.14	2.1056	5 17 27.7	15.055
19	10 22 21.57	2.0688	6 30 16.7	14.587	19	12 1 56.55	2.1080	5 32 30.4	15.034
20	10 24 25.68	2.0681	6 15 40.3	14.626	20	12 4 3.12	2.1108	5 47 31.8	15.011
21	10 26 29.74	2.0673	6 1 1.6	14.663	21	12 6 9.85	2.1135	6 2 31.7	14.986
22	10 28 33.75	2.0666	5 46 20.7	14.700	22	12 8 16.74	2.1163	6 17 30.1	14.960
23	10 30 37.73	2.0660	N. 5 31 37.6	14.736	23	12 10 23.80	2.1191	S. 6 32 26.9	14.933
TUESDAY 22.					THURSDAY 24.				
0	10 32 41.67	2.0654	N. 5 16 52.4	14.770	0	12 12 31.03	2.1220	S. 6 47 22.1	14.906
1	10 34 45.58	2.0649	5 2 5.2	14.802	1	12 14 38.44	2.1251	7 2 15.6	14.876
2	10 36 49.46	2.0645	4 47 16.1	14.834	2	12 16 46.04	2.1282	7 17 7.2	14.843
3	10 38 53.32	2.0642	4 32 25.1	14.865	3	12 18 53.82	2.1313	7 31 56.8	14.810
4	10 40 57.16	2.0638	4 17 32.3	14.894	4	12 21 1.79	2.1345	7 46 44.4	14.777
5	10 43 0.98	2.0636	4 3 37.8	14.922	5	12 23 9.96	2.1377	8 1 30.0	14.742
6	10 45 4.79	2.0634	3 47 41.6	14.949	6	12 25 18.32	2.1411	8 16 13.4	14.704
7	10 47 8.59	2.0633	3 32 43.9	14.974	7	12 27 26.89	2.1446	8 30 54.5	14.666
8	10 49 12.39	2.0633	3 17 44.7	14.999	8	12 29 35.67	2.1481	8 45 33.3	14.627
9	10 51 16.19	2.0633	3 2 44.0	15.022	9	12 31 44.66	2.1517	9 0 9.7	14.586
10	10 53 19.99	2.0635	2 47 42.0	15.043	10	12 33 53.87	2.1553	9 14 43.6	14.549
11	10 55 23.81	2.0637	2 32 38.8	15.063	11	12 36 3.30	2.1591	9 29 14.8	14.497
12	10 57 27.64	2.0639	2 17 34.4	15.089	12	12 38 12.96	2.1628	9 43 43.3	14.459
13	10 59 31.48	2.0643	2 2 28.9	15.101	13	12 40 22.84	2.1667	9 58 9.0	14.405
14	11 1 35.35	2.0647	1 47 22.3	15.118	14	12 42 32.90	2.1707	10 12 31.9	14.357
15	11 3 39.24	2.0651	1 32 14.8	15.133	15	12 44 43.32	2.1747	10 26 51.9	14.308
16	11 5 43.16	2.0657	1 17 6.4	15.147	16	12 46 53.92	2.1787	10 41 8.9	14.257
17	11 7 47.12	2.0663	1 1 57.2	15.160	17	12 49 4.77	2.1828	10 55 22.7	14.203
18	11 9 51.11	2.0669	0 46 47.2	15.172	18	12 51 15.86	2.1869	11 9 33.2	14.148
19	11 11 55.15	2.0677	0 31 36.6	15.180	19	12 53 27.20	2.1912	11 23 40.4	14.093
20	11 13 59.24	2.0685	0 16 25.4	15.191	20	12 55 38.81	2.1956	11 37 44.3	14.036
21	11 16 3.37	2.0693	N. 0 1 13.7	15.198	21	12 57 50.68	2.2000	11 51 44.7	13.977
22	11 18 7.56	2.0704	S. 0 13 58.4	15.205	22	13 0 2.81	2.2044	12 5 41.5	13.917
23	11 20 11.82	2.0715	0 29 10.9	15.210	23	13 2 15.21	2.2089	12 19 34.7	13.855
24	11 22 16.14	2.0726	S. 0 44 23.6	15.213	24	13 4 27.88	2.2135	S. 12 33 24.1	13.799

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 25.					SUNDAY 27.				
0	13 4 27.88	2.9135	S. 12° 33' 24.1"	13.792	0	14 56 47.34	2.4743	S. 21° 53' 12.7"	8.948
1	13 6 40.83	2.9189	12 47 9.7	13.797	1	14 59 15.96	2.4798	22 2 5.1	8.803
2	13 8 54.06	2.9238	13 0 51.3	13.800	2	15 1 44.91	2.4859	22 10 49.1	8.663
3	13 11 7.57	2.9275	13 14 28.9	13.809	3	15 4 14.18	2.4905	22 19 24.7	8.523
4	13 13 21.36	2.9323	13 28 2.4	13.813	4	15 6 43.77	2.4958	22 27 51.8	8.380
5	13 15 35.45	2.9372	13 41 31.7	13.818	5	15 9 13.68	2.5019	22 36 10.3	8.237
6	13 17 49.83	2.9421	13 54 56.6	13.829	6	15 11 43.91	2.5064	22 44 20.2	8.091
7	13 20 4.50	2.9471	14 8 17.2	13.836	7	15 14 14.45	2.5115	22 52 21.3	7.944
8	13 22 19.48	2.9522	14 21 33.3	13.830	8	15 16 45.29	2.5166	23 0 13.5	7.797
9	13 24 34.76	2.9572	14 34 44.8	13.819	9	15 19 16.44	2.5217	23 7 56.9	7.648
10	13 26 50.35	2.9623	14 47 51.6	13.874	10	15 21 47.89	2.5268	23 15 31.3	7.497
11	13 29 6.24	2.9674	15 0 53.7	12.994	11	15 24 19.63	2.5314	23 22 56.6	7.346
12	13 31 22.44	2.9727	15 13 50.9	12.913	12	15 26 51.66	2.5369	23 30 12.8	7.193
13	13 33 38.96	2.9779	15 26 43.2	12.830	13	15 29 23.98	2.5410	23 37 19.8	7.039
14	13 35 55.79	2.9832	15 39 30.5	12.745	14	15 31 56.58	2.5458	23 44 17.5	6.883
15	13 38 12.94	2.9885	15 52 12.6	12.658	15	15 34 29.47	2.5504	23 51 5.8	6.727
16	13 40 30.41	2.9939	16 4 49.5	12.571	16	15 37 2.63	2.5548	23 57 44.7	6.569
17	13 42 48.21	2.9993	16 17 21.1	12.481	17	15 39 36.05	2.5592	24 4 14.1	6.411
18	13 45 6.33	2.3047	16 29 47.2	12.389	18	15 42 9.73	2.5635	24 10 34.0	6.251
19	13 47 24.78	2.3102	16 42 7.8	12.297	19	15 44 43.67	2.5677	24 16 44.2	6.089
20	13 49 43.56	2.3157	16 54 22.9	12.204	20	15 47 17.86	2.5719	24 22 44.7	5.927
21	13 52 2.66	2.3212	17 6 32.3	12.108	21	15 49 52.30	2.5759	24 28 35.5	5.765
22	13 54 22.10	2.3268	17 18 35.9	12.011	22	15 52 26.97	2.5798	24 34 16.5	5.601
23	13 56 41.88	2.3325	S. 17° 30' 33.6"	11.912	23	15 55 1.88	2.5836	S. 24° 39' 47.6"	5.435
SATURDAY 26.					MONDAY 28.				
0	13 59 2.00	2.3381	S. 17° 42' 25.3"	11.819	0	15 57 37.01	2.5873	S. 24° 45' 8.7"	5.268
1	14 1 22.46	2.3437	17 54 11.0	11.710	1	16 0 12.36	2.5910	24 50 19.8	5.108
2	14 3 43.25	2.3493	18 5 50.5	11.606	2	16 2 47.93	2.5945	24 55 20.9	4.935
3	14 6 4.38	2.3550	18 17 23.7	11.501	3	16 5 23.70	2.5979	25 0 12.0	4.767
4	14 8 25.85	2.3607	18 28 50.6	11.396	4	16 7 59.67	2.6012	25 4 52.9	4.596
5	14 10 47.67	2.3665	18 40 11.1	11.287	5	16 10 35.84	2.6043	25 9 23.5	4.425
6	14 13 9.83	2.3722	18 51 25.0	11.177	6	16 13 12.19	2.6073	25 13 43.9	4.254
7	14 15 32.33	2.3779	19 2 32.3	11.068	7	16 15 48.71	2.6102	25 17 54.0	4.082
8	14 17 55.18	2.3837	19 13 32.9	10.953	8	16 18 25.41	2.6130	25 21 53.7	3.908
9	14 20 18.37	2.3894	19 24 26.6	10.838	9	16 21 2.27	2.6156	25 25 43.1	3.736
10	14 22 41.91	2.3951	19 35 13.4	10.723	10	16 23 39.28	2.6181	25 29 22.0	3.563
11	14 25 5.79	2.4008	19 45 53.3	10.605	11	16 26 16.44	2.6205	25 32 50.5	3.387
12	14 27 30.01	2.4066	19 56 26.0	10.485	12	16 28 53.74	2.6227	25 36 8.5	3.219
13	14 29 54.58	2.4123	20 6 51.5	10.365	13	16 31 31.17	2.6248	25 39 15.9	3.036
14	14 32 19.49	2.4181	20 17 9.8	10.243	14	16 34 8.72	2.6268	25 42 12.8	2.860
15	14 34 44.75	2.4238	20 27 20.7	10.120	15	16 36 46.38	2.6286	25 44 59.1	2.683
16	14 37 10.35	2.4295	20 37 24.2	9.995	16	16 39 24.15	2.6303	25 47 34.8	2.506
17	14 39 36.29	2.4352	20 47 20.1	9.868	17	16 42 2.01	2.6318	25 49 59.8	2.328
18	14 42 2.57	2.4408	20 57 8.4	9.741	18	16 44 39.96	2.6332	25 52 14.1	2.149
19	14 44 29.19	2.4465	21 6 49.0	9.611	19	16 47 17.99	2.6344	25 54 17.7	1.971
20	14 46 56.15	2.4522	21 16 21.7	9.479	20	16 49 56.09	2.6354	25 56 10.6	1.792
21	14 49 23.45	2.4578	21 25 46.5	9.347	21	16 52 34.24	2.6363	25 57 52.8	1.613
22	14 51 51.08	2.4633	21 35 3.3	9.213	22	16 55 12.44	2.6371	25 59 24.2	1.433
23	14 54 19.04	2.4688	21 44 12.1	9.078	23	16 57 50.69	2.6378	26 0 44.8	1.254
24	14 56 47.34	2.4743	S. 21° 53' 12.7"	8.949	24	17 0 28.98	2.6383	S. 26° 1' 54.7"	1.075

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 29.					THURSDAY 31.				
0	17 0 28.98	2.6383	S. 26 1 54.7	1.075	0	19 4 51.64	2.4934	S. 23 32 24.3	7.019
1	17 3 7.29	2.6386	26 2 53.8	0.895	1	19 7 21.07	2.4976	23 25 18.8	7.184
2	17 5 45.61	2.6387	26 3 42.1	0.715	2	19 9 50.15	2.4917	23 18 4.6	7.307
3	17 8 23.94	2.6388	26 4 19.6	0.535	3	19 12 18.88	2.4758	23 10 41.9	7.448
4	17 11 2.27	2.6387	26 4 46.3	0.355	4	19 14 47.25	2.4607	23 3 10.8	7.588
5	17 13 40.58	2.6383	26 5 2.2	-0.175	5	19 17 15.25	2.4636	22 55 31.3	7.797
6	17 16 18.87	2.6379	26 5 7.3	+0.005	6	19 19 42.88	2.4574	22 47 43.5	7.984
7	17 18 57.13	2.6373	26 5 1.6	0.185	7	19 22 10.14	2.4513	22 39 47.6	8.000
8	17 21 35.35	2.6368	26 4 45.1	0.364	8	19 24 37.03	2.4451	22 31 43.5	8.135
9	17 24 13.52	2.6367	26 4 17.9	0.543	9	19 27 3.55	2.4398	22 23 31.4	8.367
10	17 26 51.63	2.6348	26 3 39.9	0.739	10	19 29 29.69	2.4384	22 15 11.4	8.398
11	17 29 29.67	2.6334	26 2 51.2	0.901	11	19 31 55.44	2.4990	22 6 43.6	8.597
12	17 32 7.64	2.6391	26 1 51.8	1.080	12	19 34 20.81	2.4196	21 58 8.1	8.655
13	17 34 45.52	2.6305	26 0 41.6	1.268	13	19 36 45.79	2.4131	21 49 25.0	8.769
14	17 37 23.30	2.6288	25 59 20.8	1.436	14	19 39 10.38	2.4066	21 40 34.3	8.907
15	17 40 0.98	2.6271	25 57 49.3	1.614	15	19 41 34.58	2.4000	21 31 38.1	9.031
16	17 42 38.55	2.6251	25 56 7.1	1.799	16	19 43 58.38	2.3934	21 22 30.6	9.158
17	17 45 15.99	2.6230	25 54 14.3	1.968	17	19 46 21.79	2.3868	21 13 17.8	9.273
18	17 47 53.30	2.6207	25 52 11.0	2.143	18	19 48 44.80	2.3802	21 3 57.8	9.398
19	17 50 30.47	2.6183	25 49 57.1	2.319	19	19 51 7.41	2.3735	20 54 30.8	9.506
20	17 53 7.49	2.6158	25 47 32.7	2.494	20	19 53 29.62	2.3669	20 44 56.8	9.694
21	17 55 44.36	2.6131	25 44 57.8	2.668	21	19 55 51.44	2.3603	20 35 15.9	9.738
22	17 58 21.06	2.6108	25 42 12.5	2.842	22	19 58 12.85	2.3535	20 25 28.2	9.850
23	18 0 57.58	2.6079	S. 25 39 16.8	3.014	23	20 0 33.86	2.3467	S. 20 15 33.9	9.960
WEDNESDAY 30.					FRIDAY, AUGUST 1.				
0	18 3 33.92	2.6041	S. 25 36 10.8	3.186	0	20 2 54.46	2.3400	S. 20 5 33.0	10.069
1	18 6 10.07	2.6008	25 32 54.5	3.357	PHASES OF THE MOON.				
2	18 8 46.02	2.5974	25 29 27.9	3.529					
3	18 11 21.76	2.5939	25 25 51.0	3.700					
4	18 13 57.29	2.5908	25 22 3.9	3.868					
5	18 16 32.59	2.5884	25 18 6.8	4.035	☉ Full Moon, . . . d h m ☾ Last Quarter, . . 10 20 54.3 ● New Moon, . . . 18 21 5.9 ☽ First Quarter, . . 25 22 35.7				
6	18 19 7.66	2.5895	25 13 59.7	4.203					
7	18 21 42.49	2.5785	25 9 42.6	4.368					
8	18 24 17.08	2.5744	25 5 15.5	4.534					
9	18 26 51.42	2.5702	25 0 38.5	4.698	☾ Apogee, . . . . d h ☾ Perigee, . . . . 27 15.1				
10	18 29 25.50	2.5658	24 55 51.7	4.861					
11	18 31 59.31	2.5619	24 50 55.2	5.023					
12	18 34 32.84	2.5585	24 45 48.9	5.185					
13	18 37 6.09	2.5518	24 40 33.0	5.344					
14	18 39 39.06	2.5470	24 35 7.6	5.503					
15	18 42 11.73	2.5430	24 29 32.7	5.660					
16	18 44 44.10	2.5370	24 23 48.4	5.816					
17	18 47 16.17	2.5319	24 17 54.8	5.971					
18	18 49 47.93	2.5267	24 11 51.9	6.125					
19	18 52 19.37	2.5213	24 5 39.8	6.277					
20	18 54 50.49	2.5159	23 59 18.6	6.428					
21	18 57 21.28	2.5104	23 52 48.4	6.578					
22	18 59 51.74	2.5048	23 46 9.2	6.727					
23	19 2 21.86	2.4992	23 39 21.1	6.874					
24	19 4 51.64	2.4934	S. 23 32 24.3	7.019					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	Vh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Spica W.	44 28 25	2155	46 18 0	2155	48 7 35	2156	49 57 9	2157
	α Aquilæ E.	60 59 20	2935	59 27 45	2966	57 56 50	3001	56 26 39	3041
	Fomalhaut E.	84 24 6	2548	82 44 0	2553	81 4 0	2558	79 24 7	2565
	Jupiter E.	95 57 9	2160	94 7 41	2160	92 18 13	2161	90 28 47	2163
2	Spica W.	59 4 16	2172	60 53 26	2176	62 42 30	2181	64 31 26	2186
	α Aquilæ E.	49 9 40	3313	47 45 44	3388	46 23 14	3471	45 2 17	3563
	Fomalhaut E.	71 7 43	2621	69 29 16	2637	67 51 11	2655	66 13 31	2675
	Jupiter E.	81 22 32	2180	79 33 34	2185	77 44 44	2190	75 56 2	2197
	α Pegasi E.	91 27 27	3313	89 41 46	3317	87 56 12	3324	86 10 47	3331
3	Spica W.	73 33 34	2225	75 21 25	2234	77 9 2	2243	78 56 25	2253
	Antares W.	27 46 52	2218	29 34 52	2228	31 22 38	2237	33 10 10	2247
	Fomalhaut E.	58 12 42	2806	56 38 22	2841	55 4 47	2878	53 32 0	2918
	Jupiter E.	66 55 11	2237	65 7 38	2246	63 20 19	2256	61 33 15	2266
	α Pegasi E.	77 26 32	2376	75 42 23	2388	73 58 31	2401	72 14 57	2414
	Mars E.	101 4 57	2465	99 22 55	2475	97 41 6	2484	95 59 31	2494
4	Antares W.	42 3 54	2204	43 49 47	2217	45 35 22	2230	47 20 38	2244
	Fomalhaut E.	46 2 29	3186	44 36 3	3256	43 11 0	3332	41 47 26	3418
	Jupiter E.	52 42 12	2229	50 56 55	2244	49 11 59	2258	47 27 24	2273
	α Pegasi E.	63 42 19	2494	62 0 58	2514	60 20 4	2534	58 30 38	2555
	Saturn E.	85 17 0	2355	83 32 20	2368	81 47 59	2381	80 3 57	2395
	Mars E.	87 35 27	2554	85 55 29	2568	84 15 50	2582	82 36 30	2596
5	Antares W.	56 1 56	2415	57 45 9	2430	59 28 1	2445	61 10 31	2461
	Jupiter E.	38 50 7	2457	37 7 53	2476	35 26 6	2496	33 44 47	2516
	α Pegasi E.	50 25 16	2680	48 48 9	2709	47 11 41	2741	45 35 55	2774
	Saturn E.	71 28 56	2471	69 47 2	2487	68 5 30	2502	66 24 20	2519
	Mars E.	74 24 54	2674	72 47 39	2691	71 10 47	2708	69 34 17	2725
	α Arietis E.	91 53 20	2430	90 10 28	2445	88 27 57	2460	86 45 48	2476
6	Antares W.	69 37 28	2541	71 17 44	2557	72 57 38	2574	74 37 9	2591
	Saturn E.	58 4 28	2607	56 25 43	2626	54 47 24	2645	53 9 30	2664
	Mars E.	61 37 38	2815	60 3 29	2834	58 29 45	2853	56 56 26	2873
	α Arietis E.	78 20 37	2557	76 40 43	2573	75 1 11	2590	73 22 2	2607
7	Antares W.	82 49 9	2671	84 26 28	2687	86 3 25	2704	87 40 0	2719
	α Aquilæ W.	39 4 17	4490	40 8 18	4385	41 13 53	4293	42 20 52	4212
	Saturn E.	45 6 30	2763	43 31 14	2784	41 56 25	2805	40 22 4	2826
	Mars E.	49 16 3	2971	47 45 14	2992	46 14 51	3012	44 44 53	3033
	α Arietis E.	65 11 57	2689	63 35 3	2706	61 58 31	2723	60 22 22	2740
	Sun E.	134 14 17	3003	132 44 8	3020	131 14 20	3037	129 44 53	3054
8	α Aquilæ W.	48 12 18	3930	49 25 7	3892	50 38 35	3857	51 52 38	3827
	Saturn E.	32 37 45	2950	31 6 30	2977	29 35 49	3007	28 5 45	3039
	Mars E.	37 21 38	3143	35 54 20	3167	34 27 31	3192	33 1 12	3217
	α Arietis E.	52 26 58	2820	50 52 56	2835	49 19 14	2851	47 45 52	2866
	Aldebaran E.	85 5 21	2853	83 32 2	2868	81 59 2	2883	80 26 21	2898
	Sun E.	122 22 45	3135	120 55 18	3152	119 28 11	3168	118 1 23	3183
9	α Aquilæ W.	58 9 26	3725	59 25 47	3711	60 42 22	3699	61 59 10	3686
	α Arietis E.	40 3 54	2941	38 32 27	2956	37 1 19	2970	35 30 29	2985

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Spica W. α Aquilæ E. Fomalhaut E. Jupiter E.	51 46 42 54 57 17 77 44 24 88 39 23	2159 3085 2573 2165	53 36 12 53 28 49 76 4 52 86 50 2	2161 3133 2583 2168	55 25 38 52 1 19 74 25 33 85 0 46	2164 3187 2593 2172	57 15 0 50 34 54 72 46 29 83 11 36	2168 3247 2607 2176
2	Spica W. α Aquilæ E. Fomalhaut E. Jupiter E. α Pegasi E.	66 20 12 43 43 2 64 36 18 74 7 30 84 25 32	2194 3088 2607 2304 2338	68 8 48 42 25 39 62 59 34 72 19 8 82 40 28	2201 3782 2790 2211 2246	69 57 14 41 10 18 61 23 21 70 30 57 80 55 36	2208 3219 2747 2219 2355	71 45 30 39 57 10 59 47 43 68 42 58 79 10 57	2216 4056 2775 2227 2365
3	Spica W. Antares W. Fomalhaut E. Jupiter E. α Pegasi E. Mars E.	80 43 38 34 57 27 52 0 4 59 46 28 70 31 42 94 18 10	2264 2258 2962 2279 2422 2508	82 30 26 36 44 29 50 29 4 57 59 58 68 48 48 92 37 5	2274 2289 3011 2291 2443 2517	84 17 3 38 31 14 48 59 5 56 13 45 67 6 15 90 56 16	2286 2980 3085 2309 2460 2529	86 3 23 40 17 43 47 30 12 54 27 49 65 24 5 89 15 43	2296 2992 3122 2315 2477 2541
4	Antares W. Fomalhaut E. Jupiter E. α Pegasi E. Saturn E. Mars E.	49 5 34 40 25 30 45 43 10 56 59 41 78 20 15 80 57 29	2357 3512 2389 2577 2409 2610	50 50 10 39 5 19 43 59 19 55 20 15 76 36 53 79 18 48	2371 3618 2405 2601 2424 2626	52 34 26 37 47 4 42 15 51 53 41 21 74 53 52 77 40 29	2386 3735 2421 2626 2439 2642	54 18 21 36 30 54 40 32 47 52 3 1 73 11 13 76 2 31	2400 3686 2438 2632 2455 2658
5	Antares W. Jupiter E. α Pegasi E. Saturn E. Mars E. α Arietis E.	62 52 39 32 3 56 44 0 53 64 43 33 67 58 10 85 4 1	2477 2538 2610 2536 2743 2492	64 34 25 30 23 35 42 26 38 63 3 10 66 22 27 83 22 36	2493 2561 2648 2554 2760 2508	66 15 48 28 43 46 40 53 12 61 23 12 64 47 7 81 41 34	2509 2585 2688 2572 2768 2524	67 56 49 27 4 30 39 20 38 59 43 38 63 12 11 80 0 54	2526 2610 2632 2589 2798 2540
6	Antares W. Saturn E. Mars E. α Arietis E.	76 16 17 51 32 2 55 23 32 71 43 16	2607 2683 2691 2623	77 55 3 49 54 59 53 51 2 70 4 52	2623 2703 2611 2640	79 33 27 48 18 23 52 18 57 68 26 51	2639 2723 2631 2657	81 11 29 46 42 13 50 47 17 66 49 13	2655 2743 2651 2673
7	Antares W. α Aquilæ W. Saturn E. Mars E. α Arietis E. Sun E.	89 16 14 43 29 7 38 48 12 43 15 21 58 46 35 128 15 47	2735 4140 2850 3055 2758 3070	90 52 8 44 38 30 37 14 49 41 46 16 57 11 9 126 47 1	2750 4077 2873 3078 2772 3067	92 27 41 45 48 54 35 41 56 40 17 37 55 36 4 125 18 36	2766 4022 2896 3097 2788 3104	94 2 54 47 0 12 34 9 34 38 49 24 54 1 21 123 50 31	2781 3073 2924 3119 2804 3119
8	α Aquilæ W. Saturn E. Mars E. α Arietis E. Aldebaran E. Sun E.	53 7 12 26 36 21 31 35 23 46 12 50 78 53 59 116 34 53	3002 3075 3044 2681 2919 3197	54 22 12 25 7 41 30 10 6 44 40 7 77 21 56 115 8 40	3779 3114 3272 2697 2926 3211	55 37 36 23 39 49 28 45 22 43 7 44 75 50 10 113 42 44	3758 3159 3302 2912 2930 3225	56 53 22 22 12 51 27 21 13 41 35 40 74 18 41 112 17 5	3741 3211 3334 2926 2953 3239
9	α Aquilæ W. α Arietis E.	63 16 10 33 59 57	3679 2999	64 33 19 32 29 43	3672 3014	65 50 36 30 59 47	3684 3029	67 8 1 29 30 10	3659 3046

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
9	Aldebaran E. Sun E.	72° 47' 20" 110 51 42	2966 3253	71° 16' 34" 109 26 35	2980 3265	69° 45' 56" 108 1 43	2983 3277	68° 15' 34" 106 37 5	2985 3280
10	α Aquilæ W. Fomalhaut W. Jupiter W. Aldebaran E. Sun E.	68 25 32 43 55 33 26 16 17 60 47 34 99 37 20	3254 3200 3064 3065 3344	69 43 8 45 8 53 27 45 11 59 18 41 98 13 59	3249 3222 3064 3076 3353	71 0 49 46 22 51 29 14 5 57 50 2 96 50 49	3246 3232 3065 3087 3363	72 18 34 47 37 24 30 42 58 56 21 36 95 27 50	3244 3277 3066 3087 3371
11	Fomalhaut W. Jupiter W. α Pegasi W. Aldebaran E. Sun E.	53 57 16 38 6 44 31 1 43 49 2 37 88 35 6	3280 3078 3245 3148 3405	55 14 24 39 35 21 32 19 20 47 35 26 87 12 55	3263 3080 3203 3158 3410	56 31 50 41 3 55 33 38 0 46 8 27 85 50 50	3247 3082 3265 3160 3415	57 49 34 42 32 27 34 57 12 44 41 41 84 28 51	3232 3083 3233 3179 3421
12	Fomalhaut W. Jupiter W. α Pegasi W. Aldebaran E. Sun E.	64 21 56 49 54 43 41 41 1 37 30 56 77 40 0	3570 3087 3415 3235 3434	65 41 3 51 23 8 43 3 1 36 5 28 76 18 22	3559 3087 3396 3248 3435	67 0 22 52 51 33 44 25 20 34 40 16 74 56 45	3550 3087 3392 3263 3436	68 19 51 54 19 59 45 47 57 33 15 21 73 35 9	3540 3088 3396 3278 3437
13	Fomalhaut W. Jupiter W. α Pegasi W. Saturn W. Mars W. Sun E.	74 59 48 61 42 34 52 45 3 29 18 55 21 44 51 66 47 2	3497 3075 3303 3236 3229 3430	76 20 15 63 11 14 54 9 11 30 44 21 23 3 23 65 25 19	3489 3073 3222 3220 3267 3427	77 40 51 64 39 57 55 33 32 32 10 6 24 22 33 64 3 33	3481 3082 3222 3205 3232 3424	79 1 36 66 8 44 56 58 5 33 36 9 25 42 15 62 41 44	3474 3085 3271 3192 3212 3421
14	Jupiter W. α Pegasi W. Saturn W. Mars W. α Arietis W. Sun E.	73 34 5 64 3 53 40 50 9 32 27 6 20 28 15 55 51 25	3040 3220 3134 3414 3153 3326	75 3 28 65 29 39 42 17 38 33 49 7 21 55 20 54 29 3	3034 3202 3193 3329 3133 3320	76 32 59 66 55 37 43 45 20 35 11 25 23 22 49 53 6 35	3027 3120 3112 3324 3116 3324	78 2 38 68 21 47 45 13 15 36 34 0 24 50 39 51 44 0	3022 3122 3108 3322 3121 3376
15	Jupiter W. α Pegasi W. Saturn W. Mars W. α Arietis W. Sun E.	85 33 6 75 35 34 52 36 0 43 30 58 32 14 21 44 48 52	2983 3132 3042 3301 3032 3336	87 3 40 77 2 56 54 5 12 44 55 8 33 43 54 43 25 22	2974 3122 3032 3222 3022 3327	88 34 25 78 30 30 55 34 37 46 19 32 35 13 42 42 1 42	2965 3112 3022 3276 3022 3312	90 5 21 79 58 16 57 4 15 47 44 11 36 43 45 40 27 52	2957 3102 3217 3224 2927 3302
16	Saturn W. Mars W. α Arietis W. Sun E.	64 35 46 54 51 10 44 17 37 33 35 48	2963 3201 2932 3258	66 6 45 56 17 18 45 49 7 32 10 47	2951 3122 2927 3247	67 37 59 57 43 42 47 20 52 30 45 33	2940 3175 2916 3226	69 9 27 59 10 21 48 52 51 29 20 7	2922 3163 2924 3225
21	Sun W. Spica E.	26 5 55 57 50 4	2515 2508	27 40 4 56 9 2	2507 2500	29 14 23 54 27 49	2722 2422	30 48 53 52 46 25	2720 2425
22	Sun W. Spica E. Antares E.	38 44 6 44 16 58 89 57 1	2750 2452 2438	40 19 40 42 34 37 88 14 20	2743 2446 2431	41 55 23 40 52 8 86 31 29	2735 2441 2424	43 31 16 39 9 31 84 48 29	2728 2426 2417





## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
23	SUN	W.	51° 32' 55"	2606	53° 9' 40"	2680	54° 46' 34"	2683	56° 23' 36"	2678.
	Regulus	W.	23 57 11	2429	25 40 4	2419	27 23 12	2409	29 6 34	2401
	Antares	E.	76 11 11	2387	74 27 18	2381	72 43 16	2376	70 59 7	2371
24	SUN	W.	64 30 36	2651	66 8 22	2646	67 46 14	2643	69 24 12	2637
	Regulus	W.	37 46 14	2364	39 30 40	2359	41 15 14	2353	42 59 57	2347
	Venus	W.	19 36 32	2707	21 13 2	2699	22 49 53	2678	24 27 2	2666
	Antares	E.	62 16 28	2346	60 31 35	2341	58 46 35	2337	57 1 29	2333
25	SUN	W.	77 35 35	2616	79 14 8	2619	80 52 47	2607	82 31 32	2604
	Regulus	W.	51 45 22	2393	53 30 48	2319	55 16 20	2315	57 1 57	2312
	Venus	W.	32 36 17	2622	34 14 42	2615	35 53 16	2610	37 31 58	2603
	Antares	E.	48 14 27	2313	46 28 46	2309	44 42 59	2305	42 57 7	2302
26	SUN	W.	90 46 25	2588	92 25 37	2585	94 4 53	2583	95 44 12	2580
	Regulus	W.	65 51 22	2395	67 37 29	2391	69 23 41	2389	71 9 57	2387
	Venus	W.	45 47 24	2578	47 26 49	2574	49 6 20	2570	50 45 56	2566
	Antares	E.	34 6 36	2387	32 20 17	2385	30 33 55	2382	28 47 29	2379
	α Aquilæ	E.	89 16 33	2355	87 43 17	2354	86 9 59	2353	84 36 40	2354
27	SUN	W.	104 1 35	2569	105 41 12	2568	107 20 51	2567	109 0 31	2566
	Regulus	W.	80 2 7	2377	81 48 41	2374	83 35 18	2373	85 21 57	2372
	Venus	W.	59 5 9	2551	60 45 11	2548	62 25 17	2546	64 5 26	2545
	Spica	W.	26 2 59	2302	27 48 55	2297	29 34 59	2293	31 21 9	2289
	α Aquilæ	E.	76 50 56	2378	75 18 9	2366	73 45 32	2366	72 13 8	2368
28	SUN	W.	117 19 9	2564	118 58 53	2564	120 38 37	2564	122 18 21	2565
	Regulus	W.	94 15 28	2370	96 2 12	2370	97 48 55	2371	99 35 37	2372
	Venus	W.	72 26 44	2538	74 7 4	2538	75 47 25	2538	77 27 46	2538
	Spica	W.	40 13 5	2379	41 59 36	2377	43 46 9	2377	45 32 42	2377
	α Aquilæ	E.	64 35 37	2394	63 5 17	2318	61 35 26	2344	60 6 8	2373
	Fomalhaut	E.	88 17 35	2365	86 40 8	2366	85 2 43	2369	83 25 22	2373
	Jupiter	E.	99 6 54	2256	97 19 49	2256	95 32 44	2256	93 45 40	2256
29	Venus	W.	85 49 22	2542	87 29 37	2544	89 9 49	2546	90 49 58	2548
	Spica	W.	54 25 21	2381	56 11 49	2383	57 58 14	2385	59 44 35	2386
	α Aquilæ	E.	52 49 55	2374	51 25 13	2397	50 1 33	2387	48 39 2	2453
	Fomalhaut	E.	75 20 16	2706	73 43 44	2716	72 7 26	2729	70 31 24	2742
	Jupiter	E.	84 50 37	2264	83 3 44	2266	81 16 54	2268	79 30 7	2270
30	Venus	W.	99 9 44	2566	100 49 26	2570	102 29 2	2575	104 8 31	2580
	Spica	W.	68 35 16	2305	70 21 8	2310	72 6 53	2315	73 52 31	2320
	Antares	W.	22 48 6	2300	24 34 6	2304	26 20 0	2309	28 5 47	2314
	Fomalhaut	E.	62 36 8	2329	61 2 18	2352	59 28 58	2378	57 56 11	2396
	Jupiter	E.	70 37 28	2291	68 51 15	2296	67 5 10	2301	65 19 12	2307
	α Pegasi	E.	82 15 17	2451	80 32 55	2457	78 50 41	2464	77 8 37	2472
31	Spica	W.	82 38 37	2351	84 23 22	2359	86 7 56	2366	87 52 19	2374
	Antares	W.	36 52 36	2345	38 37 30	2353	40 22 13	2360	42 6 45	2368
	Fomalhaut	E.	50 22 15	2390	48 53 53	2439	47 26 31	2492	46 0 12	2550
	Jupiter	E.	56 31 43	2342	54 46 45	2351	53 2 0	2359	51 17 27	2368
	α Pegasi	E.	68 41 18	2520	67 0 32	2539	65 20 3	2545	63 39 53	2559
	Saturn	E.	90 53 56	2382	89 9 56	2389	87 26 6	2398	85 42 28	2405

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	Sun	W.	58 0 45	2679	59 38 2	2667	61 15 26	2663	62 52 57	2656
	Regulus	W.	30 50 8	2399	32 33 54	2385	34 17 50	2378	36 1 57	2371
	Antares	E.	69 14 50	2385	67 30 25	2380	65 45 53	2355	64 1 14	2350
24	Sun	W.	71 2 16	2632	72 40 27	2628	74 18 44	2624	75 57 7	2620
	Regulus	W.	44 44 48	2342	46 29 46	2337	48 14 51	2333	50 0 3	2328
	Venus	W.	26 4 27	2656	27 42 6	2646	29 19 58	2637	30 58 2	2629
	Antares	E.	55 16 17	2328	53 30 59	2324	51 45 34	2320	50 0 3	2316
25	Sun	W.	84 10 22	2601	85 49 16	2597	87 28 15	2594	89 7 18	2591
	Regulus	W.	58 47 39	2308	60 33 27	2304	62 19 21	2301	64 5 19	2298
	Venus	W.	39 10 49	2597	40 49 48	2592	42 28 54	2588	44 8 6	2583
	Antares	E.	41 11 10	2328	39 25 8	2326	37 39 2	2323	35 52 51	2289
26	Sun	W.	97 23 34	2577	99 3 0	2575	100 42 29	2573	102 22 1	2572
	Regulus	W.	72 56 16	2284	74 42 39	2282	76 29 5	2279	78 15 35	2278
	Venus	W.	52 25 38	2562	54 5 25	2559	55 45 16	2556	57 25 11	2554
	Antares	E.	27 0 59	2377	25 14 25	2375	23 27 49	2374	21 41 12	2374
	$\alpha$ Aquilæ	E.	83 3 22	2856	81 30 7	2860	79 56 57	2865	78 23 53	2870
27	Sun	W.	110 40 12	2565	112 19 55	2564	113 59 39	2564	115 39 24	2564
	Regulus	W.	87 8 37	2272	88 55 18	2271	90 42 0	2270	92 28 44	2270
	Venus	W.	65 45 37	2543	67 25 51	2541	69 6 7	2540	70 46 25	2539
	Spica	W.	33 7 25	2986	34 53 45	2983	36 40 9	2981	38 26 36	2980
	$\alpha$ Aquilæ	E.	70 40 59	2921	69 9 7	2937	67 37 35	2954	66 6 24	2973
28	Sun	W.	123 58 4	2566	125 37 45	2568	127 17 24	2569	128 57 1	2571
	Regulus	W.	101 22 18	2272	103 8 58	2274	104 55 36	2275	106 42 12	2277
	Venus	W.	79 8 7	2538	80 48 27	2538	82 28 47	2540	84 9 5	2540
	Spica	W.	47 19 15	2977	49 5 48	2978	50 52 20	2979	52 38 51	2979
	$\alpha$ Aquilæ	E.	58 37 26	3106	57 9 24	3142	55 42 5	3182	54 15 34	3225
	Fomalhaut	E.	81 48 6	2678	80 10 56	2683	78 33 53	2689	76 56 59	2698
	Jupiter	E.	91 58 36	2857	90 11 33	2258	88 24 32	2260	86 37 33	2262
29	Venus	W.	92 30 4	2551	94 10 6	2554	95 50 4	2558	97 29 57	2562
	Spica	W.	61 30 52	2991	63 17 5	2994	65 3 14	2997	66 49 18	2301
	$\alpha$ Aquilæ	E.	47 17 45	3596	45 57 50	3608	44 39 24	3698	43 22 35	3799
	Fomalhaut	E.	68 55 40	2758	67 20 14	2771	65 45 8	2788	64 10 25	2808
	Jupiter	E.	77 43 24	2974	75 56 46	2978	74 10 14	2982	72 23 48	2986
30	Venus	W.	105 47 53	2586	107 27 7	2592	109 6 13	2599	110 45 10	2604
	Spica	W.	75 38 1	2996	77 23 23	2331	79 8 37	2337	80 53 42	2344
	Antares	W.	29 51 26	2390	31 36 57	2396	33 22 19	2332	35 7 32	2338
	Fomalhaut	E.	56 24 0	2936	54 52 27	2969	53 21 36	3005	51 51 31	3046
	Jupiter	E.	63 33 23	2313	61 47 43	2320	60 2 13	2327	58 16 53	2334
	$\alpha$ Pegasi	E.	75 26 44	2480	73 45 3	2489	72 3 34	2492	70 22 19	2500
31	Spica	W.	89 36 31	2382	91 20 31	2391	93 4 18	2401	94 47 52	2410
	Antares	W.	43 51 5	2377	45 35 13	2385	47 19 9	2394	49 2 53	2403
	Fomalhaut	E.	44 35 2	2315	43 11 8	2387	41 48 37	2406	40 27 35	2555
	Jupiter	E.	49 33 7	2378	47 49 1	2389	46 5 10	2400	44 21 35	2471
	$\alpha$ Pegasi	E.	62 0 2	2574	60 20 31	2589	58 41 21	2605	57 2 33	2623
	Saturn	E.	83 59 1	2414	82 15 46	2423	80 32 44	2433	78 49 56	2442

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
Frid.	1	<sup>b</sup> 8 <sup>m</sup> 45 <sup>s</sup> 1.02	9.711	N. 18° 3' 59.3"	-37.65	15 48.05	66.67	<sup>m</sup> 6 <sup>s</sup> 6.49	0.146
Sat.	2	8 48 53.77	9.686	17 48 46.7	38.39	15 48.18	66.58	6 2.70	0.171
Sun.	3	8 52 45.91	9.661	17 33 16.6	39.12	15 48.31	66.49	5 58.29	0.196
Mon.	4	8 56 37.44	9.635	17 17 29.3	39.83	15 48.44	66.40	5 53.28	0.221
Tues.	5	9 0 28.38	9.610	17 1 25.3	40.52	15 48.57	66.32	5 47.67	0.246
Wed.	6	9 4 18.73	9.586	16 45 4.7	41.20	15 48.71	66.23	5 41.48	0.270
Thur.	7	9 8 8.50	9.562	16 28 27.6	41.88	15 48.85	66.14	5 34.72	0.294
Frid.	8	9 11 57.69	9.538	16 11 34.7	42.54	15 49.00	66.05	5 27.38	0.317
Sat.	9	9 15 46.31	9.514	15 54 26.0	43.19	15 49.15	65.97	5 19.47	0.341
Sun.	10	9 19 34.38	9.491	15 37 1.8	43.83	15 49.30	65.88	5 11.00	0.364
Mon.	11	9 23 21.89	9.468	15 19 22.5	44.45	15 49.46	65.80	5 1.98	0.387
Tues.	12	9 27 8.85	9.445	15 1 28.5	45.06	15 49.62	65.72	4 52.42	0.410
Wed.	13	9 30 55.26	9.423	14 43 19.8	45.66	15 49.78	65.64	4 42.30	0.433
Thur.	14	9 34 41.13	9.401	14 24 57.0	46.24	15 49.95	65.56	4 31.65	0.455
Frid.	15	9 38 26.47	9.379	14 6 20.4	46.81	15 50.12	65.48	4 20.46	0.477
Sat.	16	9 42 11.29	9.357	13 47 30.3	47.37	15 50.30	65.40	4 8.76	0.498
Sun.	17	9 45 55.60	9.335	13 28 26.9	47.90	15 50.49	65.32	3 56.54	0.520
Mon.	18	9 49 39.39	9.314	13 9 10.6	48.43	15 50.68	65.25	3 43.82	0.541
Tues.	19	9 53 22.67	9.294	12 49 42.0	48.94	15 50.87	65.18	3 30.58	0.562
Wed.	20	9 57 5.46	9.274	12 30 1.2	49.44	15 51.07	65.11	3 16.85	0.582
Thur.	21	10 0 47.77	9.253	12 10 8.5	49.93	15 51.27	65.04	3 2.64	0.602
Frid.	22	10 4 29.59	9.232	11 50 4.3	50.40	15 51.48	64.98	2 47.95	0.622
Sat.	23	10 8 10.94	9.213	11 29 49.2	50.86	15 51.69	64.91	2 32.78	0.641
Sun.	24	10 11 51.84	9.194	11 9 23.2	51.30	15 51.90	64.85	2 17.17	0.660
Mon.	25	10 15 32.30	9.176	10 48 46.7	51.74	15 52.12	64.79	2 1.12	0.678
Tues.	26	10 19 12.33	9.158	10 27 59.8	52.16	15 52.33	64.73	1 44.64	0.695
Wed.	27	10 22 51.95	9.142	10 7 3.1	52.57	15 52.55	64.68	1 27.74	0.712
Thur.	28	10 26 31.16	9.126	9 45 57.0	52.97	15 52.77	64.62	1 10.45	0.728
Frid.	29	10 30 10.01	9.111	9 24 41.7	53.36	15 52.99	64.57	0 52.80	0.743
Sat.	30	10 33 48.51	9.096	9 3 17.4	53.73	15 53.22	64.52	0 34.80	0.758
Sun.	31	10 37 26.66	9.083	8 41 44.4	54.08	15 53.45	64.47	0 16.45	0.772
Mon.	32	10 41 4.50	9.070	N. 8 20 2.9	-54.42	15 53.68	64.42	0 2.22	0.785

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0°.18 from the Sideral Time.

— prefixed to the hourly change of declination indicates that north declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be subtracted from		Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.				
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.	added to Mean Time.							
		h	m		s	°			'			"			
Frid.	1	8	45	0.04	9.711	N. 18	4	3.1	37.65	6	6.51	0.146	8	38	53.53
Sat.	2	8	48	52.80	9.686	17	48	50.5	38.39	6	2.72	0.171	8	42	50.08
Sun.	3	8	52	44.95	9.661	17	33	20.5	39.12	5	58.31	0.196	8	46	46.64
Mon.	4	8	56	36.50	9.635	17	17	33.2	39.83	5	53.30	0.221	8	50	43.20
Tues.	5	9	0	27.45	9.610	17	1	29.2	40.52	5	47.69	0.246	8	54	39.76
Wed.	6	9	4	17.82	9.586	16	45	8.6	41.20	5	41.51	0.270	8	58	36.31
Thur.	7	9	8	7.62	9.562	16	28	31.5	41.88	5	34.75	0.294	9	2	32.87
Frid.	8	9	11	56.83	9.539	16	11	38.5	42.54	5	27.41	0.317	9	6	29.42
Sat.	9	9	15	45.47	9.515	15	54	29.8	43.19	5	19.49	0.341	9	10	25.98
Sun.	10	9	19	33.56	9.492	15	37	5.6	43.83	5	11.03	0.364	9	14	22.53
Mon.	11	9	23	21.10	9.469	15	19	26.2	44.45	5	2.01	0.387	9	18	19.09
Tues.	12	9	27	8.09	9.446	15	1	32.1	45.06	4	52.45	0.410	9	22	15.64
Wed.	13	9	30	54.53	9.424	14	43	23.3	45.66	4	42.33	0.433	9	26	12.20
Thur.	14	9	34	40.43	9.402	14	25	0.4	46.24	4	31.68	0.455	9	30	8.75
Frid.	15	9	38	25.80	9.380	14	6	23.8	46.81	4	20.49	0.477	9	34	5.31
Sat.	16	9	42	10.65	9.358	13	47	33.6	47.37	4	8.79	0.498	9	38	1.86
Sun.	17	9	45	54.99	9.336	13	28	30.0	47.91	3	56.57	0.520	9	41	58.42
Mon.	18	9	49	38.82	9.315	13	9	13.6	48.44	3	43.85	0.541	9	45	54.97
Tues.	19	9	53	22.14	9.295	12	49	44.8	48.95	3	30.61	0.562	9	49	51.53
Wed.	20	9	57	4.96	9.275	12	30	3.8	49.45	3	16.88	0.582	9	53	48.08
Thur.	21	10	0	47.31	9.254	12	10	11.0	49.94	3	2.67	0.602	9	57	44.64
Frid.	22	10	4	29.17	9.234	11	50	6.6	50.41	2	47.98	0.622	10	1	41.19
Sat.	23	10	8	10.56	9.215	11	29	51.3	50.87	2	32.81	0.641	10	5	37.75
Sun.	24	10	11	51.50	9.196	11	9	25.1	51.31	2	17.20	0.660	10	9	34.30
Mon.	25	10	15	32.00	9.178	10	48	48.4	51.75	2	1.14	0.678	10	13	30.86
Tues.	26	10	19	12.07	9.160	10	28	1.3	52.17	1	44.66	0.695	10	17	27.41
Wed.	27	10	22	51.73	9.144	10	7	4.4	52.58	1	27.76	0.712	10	21	23.97
Thur.	28	10	26	30.99	9.128	9	45	58.0	52.98	1	10.47	0.728	10	25	20.52
Frid.	29	10	30	9.89	9.113	9	24	42.5	53.37	0	52.81	0.743	10	29	17.08
Sat.	30	10	33	48.43	9.098	9	3	17.9	53.74	0	34.81	0.758	10	33	13.62
Sun.	31	10	37	26.63	9.085	8	41	44.6	54.09	0	16.45	0.772	10	37	10.18
Mon.	32	10	41	4.51	9.072	N. 8	20	2.9	54.43	0	2.22	0.785	10	41	6.73

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

— prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 hour.  
+ 9".8565  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal $^{\circ}$ .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	213	128 <sup>o</sup> 49' 21.9"	48 <sup>o</sup> 35.6"	143.51	+0.41	0.0063456	-24.3	15 <sup>h</sup> 18 <sup>m</sup> 35.57 <sup>s</sup>	
2	214	129 46 46.6	46 0.2	143.55	0.55	.0062866	24.8	15 14 39.66	
3	215	130 44 12.2	43 25.7	143.59	0.68	.0062264	25.3	15 10 43.75	
4	216	131 41 38.8	40 52.1	143.63	0.80	.0061650	25.8	15 6 47.84	
5	217	132 39 6.5	38 19.6	143.68	0.87	.0061024	26.4	15 2 51.93	
6	218	133 36 35.4	35 48.4	143.73	0.93	.0060384	27.0	14 58 56.02	
7	219	134 34 5.5	33 18.4	143.78	0.98	.0059730	27.6	14 55 0.11	
8	220	135 31 36.9	30 49.7	143.83	0.99	.0059063	28.1	14 51 4.20	
9	221	136 29 9.7	28 22.3	143.89	0.95	.0058382	28.7	14 47 8.29	
10	222	137 26 43.9	25 56.3	143.95	0.91	.0057685	29.4	14 43 12.38	
11	223	138 24 19.6	23 31.9	144.01	0.82	.0056970	30.1	14 39 16.47	
12	224	139 21 56.8	21 9.0	144.08	0.73	.0056237	30.9	14 35 20.56	
13	225	140 19 35.5	18 47.6	144.14	0.60	.0055485	31.7	14 31 24.65	
14	226	141 17 15.6	16 27.5	144.20	0.47	.0054713	32.6	14 27 28.74	
15	227	142 14 57.0	14 8.7	144.26	0.33	.0053920	33.5	14 23 32.84	
16	228	143 12 39.8	11 51.4	144.31	0.20	.0053105	34.4	14 19 36.93	
17	229	144 10 24.1	9 35.6	144.37	+0.09	.0052269	35.2	14 15 41.02	
18	230	145 8 9.8	7 21.2	144.43	-0.01	.0051412	36.1	14 11 45.11	
19	231	146 5 57.1	5 8.3	144.48	0.11	.0050534	37.0	14 7 49.20	
20	232	147 3 45.4	2 56.5	144.53	0.17	.0049635	37.8	14 3 53.29	
21	233	148 1 34.9	0 45.9	144.58	0.19	.0048718	38.6	13 59 57.38	
22	234	148 59 25.7	58 36.6	144.64	0.19	.0047782	39.4	13 56 1.47	
23	235	149 57 17.7	56 28.5	144.69	0.14	.0046829	40.0	13 52 5.56	
24	236	150 55 10.9	54 21.5	144.74	-0.09	.0045860	40.6	13 48 9.65	
25	237	151 53 5.3	52 15.8	144.79	+0.01	.0044878	41.2	13 44 13.74	
26	238	152 51 1.1	50 11.5	144.84	0.11	.0043883	41.7	13 40 17.83	
27	239	153 48 58.1	48 8.4	144.90	0.24	.0042875	42.1	13 36 21.93	
28	240	154 46 56.5	46 6.6	144.96	0.37	.0041857	42.5	13 32 26.02	
29	241	155 44 56.2	44 6.2	145.02	0.51	.0040831	42.8	13 28 30.11	
30	242	156 42 57.4	42 7.3	145.08	0.64	.0039800	43.0	13 24 34.20	
31	243	157 41 0.2	40 10.0	145.14	0.74	.0038763	43.3	13 20 38.30	
32	244	158 39 4.6	38 14.3	145.21	+0.84	0.0037719	-43.6	13 16 42.39	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>h</sup> .0.									Diff. for 1 hour. — 0 <sup>h</sup> .8226 (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>d</sup>
1	15 54.4	15 49.8	56 15.9	-1.33	57 59.2	-1.44	11 49.3	2.17	13.1
2	15 44.9	15 39.8	57 41.3	1.54	57 22.3	1.61	12 39.4	2.00	14.1
3	15 34.5	15 29.0	57 2.7	1.65	56 42.8	1.67	13 25.9	1.87	15.1
4	15 23.6	15 18.3	56 22.8	1.65	56 3.2	1.60	14 9.8	1.79	16.1
5	15 13.2	15 8.4	55 44.4	1.52	55 26.8	1.42	14 52.2	1.75	17.1
6	15 3.9	14 59.9	55 10.5	1.29	54 55.9	1.14	15 34.2	1.75	18.1
7	14 56.5	14 53.7	54 43.3	0.96	54 32.8	0.78	16 16.7	1.79	19.1
8	14 51.4	14 49.8	54 24.5	0.59	54 18.7	-0.38	17 0.6	1.87	20.1
9	14 48.9	14 48.8	54 15.4	-0.17	54 14.7	+0.05	17 46.5	1.96	21.1
10	14 49.2	14 50.5	54 16.6	+0.26	54 21.1	0.47	18 34.8	2.06	22.1
11	14 52.4	14 54.9	54 28.1	0.68	54 37.6	0.89	19 25.3	2.14	23.1
12	14 58.2	15 1.9	54 49.4	1.07	55 3.3	1.24	20 17.4	2.19	24.1
13	15 6.3	15 11.1	55 19.1	1.39	55 36.5	1.52	21 10.1	2.20	25.1
14	15 16.2	15 21.5	55 55.4	1.62	56 15.3	1.69	22 2.5	2.16	26.1
15	15 27.1	15 32.9	56 35.9	1.73	56 56.7	1.73	22 53.8	2.10	27.1
16	15 38.5	15 44.0	57 17.5	1.71	57 37.8	1.66	23 43.6	2.05	28.1
17	15 49.3	15 54.3	57 57.3	1.57	58 15.5	1.46	6		29.1
18	15 58.8	16 2.9	58 32.2	1.32	58 47.1	1.16	0 32.4	2.02	0.7
19	16 6.4	16 9.3	59 0.0	0.98	59 10.7	0.80	1 20.8	2.02	1.7
20	16 11.6	16 13.3	59 19.2	0.62	59 25.5	0.43	2 9.7	2.06	2.7
21	16 14.4	16 15.0	59 29.6	+0.25	59 31.5	+0.08	3 0.1	2.15	3.7
22	16 15.0	16 14.5	59 31.5	-0.08	59 29.7	-0.22	3 53.1	2.28	4.7
23	16 13.5	16 12.2	59 26.3	0.35	59 21.4	0.47	4 49.1	2.40	5.7
24	16 10.5	16 8.6	59 15.2	0.57	59 7.9	0.66	5 48.0	2.50	6.7
25	16 6.3	16 3.7	58 59.5	0.74	58 50.2	0.81	6 48.5	2.53	7.7
26	16 1.0	15 58.0	58 40.1	0.88	58 29.2	0.94	7 48.8	2.48	8.7
27	15 54.8	15 51.5	58 17.6	1.00	58 5.2	1.06	8 46.9	2.35	9.7
28	15 47.9	15 44.1	57 52.2	1.12	57 38.3	1.18	9 41.4	2.19	10.7
29	15 40.2	15 36.1	57 23.9	1.23	57 8.9	1.27	10 32.1	2.03	11.7
30	15 31.9	15 27.7	56 53.5	1.30	56 37.8	1.32	11 19.3	1.90	12.7
31	15 23.3	15 19.0	56 21.9	1.32	56 6.0	1.31	12 3.9	1.81	13.7
32	15 14.7	15 10.5	55 50.2	-1.30	55 34.8	-1.26	12 46.8	1.77	14.7

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 1.					SUNDAY 3.				
0	20 2 54.46	2.3400	S. 20° 5' 33.0"	10.069	0	21 47 48.20	2.0450	S. 10° 27' 5.2"	12.446
1	20 5 14.66	2.3333	19 55 25.6	10.177	1	21 49 50.75	2.0401	10 13 37.4	12.480
2	20 7 34.46	2.3266	19 45 11.8	10.289	2	21 51 53.01	2.0352	10 0 7.6	12.513
3	20 9 53.85	2.3198	19 34 51.7	10.366	3	21 53 54.97	2.0303	9 46 35.8	12.545
4	20 12 12.84	2.3131	19 24 25.5	10.488	4	21 55 56.65	2.0256	9 33 2.2	12.576
5	20 14 31.42	2.3063	19 13 53.1	10.590	5	21 57 58.04	2.0208	9 19 26.7	12.606
6	20 16 49.60	2.2996	19 3 14.7	10.689	6	21 59 59.15	2.0169	9 5 49.5	12.634
7	20 19 7.37	2.2928	18 52 30.4	10.787	7	22 1 59.98	2.0116	8 52 10.6	12.661
8	20 21 24.74	2.2862	18 41 40.3	10.883	8	22 4 0.54	2.0071	8 38 30.2	12.686
9	20 23 41.71	2.2795	18 30 44.5	10.977	9	22 6 0.83	2.0026	8 24 48.3	12.711
10	20 25 58.28	2.2728	18 19 43.1	11.069	10	22 8 0.85	1.9983	8 11 4.9	12.734
11	20 28 14.45	2.2661	18 8 36.2	11.160	11	22 10 0.62	1.9940	7 57 20.2	12.756
12	20 30 30.21	2.2594	17 57 23.9	11.249	12	22 12 0.13	1.9897	7 43 34.2	12.777
13	20 32 45.58	2.2528	17 46 6.3	11.337	13	22 13 59.38	1.9855	7 29 47.0	12.797
14	20 35 0.55	2.2462	17 34 43.4	11.424	14	22 15 58.39	1.9814	7 15 58.6	12.815
15	20 37 15.12	2.2396	17 23 15.4	11.508	15	22 17 57.15	1.9773	7 2 9.2	12.838
16	20 39 29.30	2.2331	17 11 42.4	11.591	16	22 19 55.67	1.9734	6 48 18.8	12.848
17	20 41 43.09	2.2265	17 0 4.5	11.673	17	22 21 53.96	1.9695	6 34 27.4	12.863
18	20 43 56.48	2.2199	16 48 21.7	11.752	18	22 23 52.01	1.9657	6 20 35.2	12.877
19	20 46 9.48	2.2135	16 36 34.2	11.831	19	22 25 49.84	1.9619	6 6 42.2	12.889
20	20 48 22.10	2.2071	16 24 42.0	11.908	20	22 27 47.44	1.9583	5 52 48.5	12.901
21	20 50 34.33	2.2007	16 12 45.3	11.983	21	22 29 44.82	1.9545	5 38 54.1	12.919
22	20 52 46.18	2.1942	16 0 44.1	12.057	22	22 31 41.98	1.9510	5 24 59.1	12.929
23	20 54 57.64	2.1878	S. 15 48 38.5	12.126	23	22 33 38.94	1.9476	S. 5 11 3.5	12.930
SATURDAY 2.					MONDAY 4.				
0	20 57 8.72	2.1816	S. 15 36 28.7	12.198	0	22 35 35.69	1.9449	S. 4 57 7.5	12.937
1	20 59 19.43	2.1753	15 24 14.7	12.267	1	22 37 32.24	1.9408	4 43 11.1	12.943
2	21 1 29.76	2.1691	15 11 56.6	12.335	2	22 39 28.59	1.9375	4 29 14.3	12.948
3	21 3 39.72	2.1629	14 59 34.5	12.401	3	22 41 24.74	1.9343	4 15 17.3	12.952
4	21 5 49.31	2.1568	14 47 8.5	12.465	4	22 43 20.70	1.9312	4 1 20.1	12.955
5	21 7 58.54	2.1507	14 34 38.7	12.528	5	22 45 16.48	1.9281	3 47 22.7	12.957
6	21 10 7.40	2.1447	14 22 5.2	12.589	6	22 47 12.07	1.9251	3 33 25.2	12.958
7	21 12 15.90	2.1387	14 9 28.0	12.649	7	22 49 7.49	1.9222	3 19 27.7	12.958
8	21 14 24.04	2.1327	13 56 47.3	12.707	8	22 51 2.73	1.9193	3 5 30.2	12.957
9	21 16 31.83	2.1268	13 44 3.2	12.763	9	22 52 57.80	1.9165	2 51 32.8	12.955
10	21 18 39.26	2.1210	13 31 15.7	12.819	10	22 54 52.71	1.9138	2 37 35.6	12.952
11	21 20 46.35	2.1152	13 18 24.9	12.873	11	22 56 47.46	1.9112	2 23 38.6	12.948
12	21 22 53.09	2.1095	13 5 30.9	12.926	12	22 58 42.05	1.9086	2 9 41.8	12.943
13	21 24 59.49	2.1038	12 52 33.8	12.977	13	23 0 36.49	1.9061	1 55 45.4	12.937
14	21 27 5.55	2.0982	12 39 33.7	13.026	14	23 2 30.78	1.9037	1 41 49.3	12.931
15	21 29 11.27	2.0926	12 26 30.7	13.074	15	23 4 24.93	1.9013	1 27 53.7	12.923
16	21 31 16.66	2.0871	12 13 24.8	13.122	16	23 6 18.94	1.8991	1 13 58.6	12.914
17	21 33 21.72	2.0816	12 0 16.1	13.167	17	23 8 12.82	1.8968	1 0 4.0	12.905
18	21 35 26.45	2.0762	11 47 4.8	13.210	18	23 10 6.56	1.8946	0 46 10.0	12.894
19	21 37 30.86	2.0708	11 33 50.9	13.252	19	23 12 0.17	1.8926	0 32 16.7	12.883
20	21 39 34.95	2.0656	11 20 34.5	13.294	20	23 13 53.67	1.8907	0 18 24.1	12.871
21	21 41 38.73	2.0603	11 7 15.6	13.334	21	23 15 47.05	1.8887	S. 0 4 32.2	12.858
22	21 43 42.19	2.0552	10 53 54.4	13.373	22	23 17 40.31	1.8868	N. 0 9 18.9	12.844
23	21 45 45.35	2.0501	10 40 30.9	13.410	23	23 19 33.46	1.8850	0 23 9.1	12.836
24	21 47 48.20	2.0450	S. 10 27 5.2	13.446	24	23 21 26.51	1.8833	N. 0 36 58.3	12.819

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 5.					THURSDAY 7.				
0	<sup>h</sup> 23 <sup>m</sup> 21 <sup>s</sup> 26.51	1.8633	N. 0° 36' 58.3"	13.812	0	<sup>h</sup> 0 <sup>m</sup> 51 <sup>s</sup> 7.12	1.8778	N. 11° 6' 43.6"	12.144
1	23 23 19.46	1.8617	0 50 46.5	13.796	1	0 52 59.83	1.8792	11 18 50.7	12.069
2	23 25 12.31	1.8600	1 4 33.8	13.779	2	0 54 52.63	1.8807	11 30 54.7	12.040
3	23 27 5.06	1.8784	1 18 20.0	13.761	3	0 56 45.52	1.8822	11 42 55.5	11.967
4	23 28 57.72	1.8770	1 32 5.1	13.742	4	0 58 38.50	1.8838	11 54 53.1	11.933
5	23 30 50.30	1.8757	1 45 49.0	13.721	5	1 0 31.58	1.8854	12 6 47.4	11.878
6	23 32 42.80	1.8743	1 59 31.6	13.699	6	1 2 24.75	1.8871	12 18 38.4	11.823
7	23 34 35.22	1.8731	2 13 12.9	13.678	7	1 4 18.03	1.8888	12 30 26.1	11.767
8	23 36 27.57	1.8719	2 26 52.9	13.656	8	1 6 11.41	1.8906	12 42 10.4	11.709
9	23 38 19.85	1.8708	2 40 31.6	13.633	9	1 8 4.90	1.8924	12 53 51.2	11.652
10	23 40 12.07	1.8698	2 54 8.9	13.609	10	1 9 58.50	1.8943	13 5 28.6	11.594
11	23 42 4.23	1.8688	3 7 44.7	13.583	11	1 11 52.22	1.8962	13 17 2.5	11.536
12	23 43 56.32	1.8678	3 21 18.9	13.558	12	1 13 46.05	1.8982	13 28 32.9	11.477
13	23 45 48.36	1.8670	3 34 51.6	13.533	13	1 15 40.00	1.9003	13 39 59.7	11.416
14	23 47 40.36	1.8662	3 48 22.7	13.504	14	1 17 34.08	1.9024	13 51 22.8	11.355
15	23 49 32.31	1.8655	4 1 52.1	13.476	15	1 19 28.29	1.9046	14 2 42.3	11.294
16	23 51 24.22	1.8649	4 15 19.8	13.447	16	1 21 22.63	1.9067	14 13 58.1	11.232
17	23 53 16.10	1.8643	4 28 45.7	13.418	17	1 23 17.10	1.9089	14 25 10.1	11.169
18	23 55 7.94	1.8638	4 42 9.9	13.388	18	1 25 11.70	1.9113	14 36 18.4	11.106
19	23 56 59.75	1.8633	4 55 32.3	13.367	19	1 27 6.44	1.9135	14 47 22.9	11.042
20	23 58 51.54	1.8630	5 8 52.7	13.324	20	1 29 1.32	1.9159	14 58 23.5	10.977
21	0 0 43.31	1.8627	5 22 11.2	13.299	21	1 30 56.35	1.9183	15 9 20.1	10.911
22	0 2 35.06	1.8624	5 35 27.7	13.268	22	1 32 51.52	1.9208	15 20 12.8	10.845
23	0 4 26.80	1.8622	N. 5 48 42.2	13.235	23	1 34 46.85	1.9234	N. 15 31 1.5	10.779
WEDNESDAY 6.					FRIDAY 8.				
0	0 6 18.53	1.8621	N. 6 1 54.7	13.191	0	1 36 42.33	1.9259	N. 15 41 46.3	10.719
1	0 8 10.25	1.8620	6 15 5.1	13.155	1	1 38 37.96	1.9285	15 52 27.0	10.644
2	0 10 1.97	1.8621	6 28 13.3	13.119	2	1 40 33.75	1.9312	16 3 3.6	10.575
3	0 11 53.70	1.8622	6 41 19.3	13.089	3	1 42 29.70	1.9338	16 13 36.0	10.505
4	0 13 45.44	1.8623	6 54 23.1	13.044	4	1 44 25.81	1.9366	16 24 4.2	10.435
5	0 15 37.18	1.8624	7 7 24.6	13.005	5	1 46 22.09	1.9394	16 34 28.2	10.365
6	0 17 28.93	1.8627	7 20 23.7	12.965	6	1 48 18.54	1.9422	16 44 48.0	10.294
7	0 19 20.70	1.8631	7 33 20.4	12.928	7	1 50 15.16	1.9451	16 55 3.5	10.222
8	0 21 12.50	1.8635	7 46 14.8	12.887	8	1 52 11.95	1.9480	17 5 14.6	10.149
9	0 23 4.32	1.8639	7 59 6.8	12.848	9	1 54 8.92	1.9509	17 15 21.4	10.076
10	0 24 56.17	1.8644	8 11 56.3	12.803	10	1 56 6.06	1.9538	17 25 23.8	10.009
11	0 26 48.05	1.8650	8 24 43.2	12.760	11	1 58 3.38	1.9569	17 35 21.7	9.937
12	0 28 39.97	1.8657	8 37 27.5	12.717	12	2 0 0.89	1.9600	17 45 15.0	9.861
13	0 30 31.93	1.8663	8 50 9.2	12.673	13	2 1 58.58	1.9631	17 55 3.8	9.775
14	0 32 23.93	1.8671	9 2 48.2	12.628	14	2 3 56.46	1.9662	18 4 48.0	9.689
15	0 34 15.98	1.8679	9 15 24.6	12.583	15	2 5 54.52	1.9693	18 14 27.7	9.603
16	0 36 8.08	1.8688	9 27 58.2	12.537	16	2 7 52.77	1.9725	18 24 2.7	9.544
17	0 38 0.23	1.8697	9 40 29.0	12.491	17	2 9 51.22	1.9758	18 33 33.0	9.465
18	0 39 52.44	1.8707	9 52 57.1	12.444	18	2 11 49.87	1.9791	18 42 58.5	9.385
19	0 41 44.71	1.8718	10 5 22.3	12.395	19	2 13 48.71	1.9823	18 52 19.2	9.305
20	0 43 37.05	1.8729	10 17 44.5	12.346	20	2 15 47.75	1.9856	19 1 35.1	9.225
21	0 45 29.40	1.8741	10 30 3.8	12.297	21	2 17 46.98	1.9889	19 10 46.2	9.143
22	0 47 21.94	1.8753	10 42 20.1	12.247	22	2 19 46.42	1.9923	19 19 52.3	9.061
23	0 49 14.49	1.8765	10 54 33.4	12.196	23	2 21 46.06	1.9957	19 28 53.5	8.978
24	0 51 7.12	1.8778	N. 11 6 43.6	12.144	24	2 23 45.91	1.9992	N. 19 37 49.7	8.895



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 9.					MONDAY 11.				
0	2 23 45.91	1.9999	N.19 37 49.7	8.686	0	4 3 56.49	2.1747	N.24 55 23.7	4.076
1	2 25 45.97	2.0027	19 46 40.9	8.811	1	4 6 7.07	2.1780	24 59 24.8	3.959
2	2 27 46.23	2.0061	19 55 27.0	8.725	2	4 8 17.85	2.1814	25 3 18.8	3.842
3	2 29 46.70	2.0096	20 4 7.9	8.638	3	4 10 28.84	2.1847	25 7 5.8	3.724
4	2 31 47.38	2.0132	20 12 43.6	8.552	4	4 12 40.02	2.1880	25 10 45.7	3.605
5	2 33 48.28	2.0167	20 21 14.2	8.466	5	4 14 51.40	2.1912	25 14 18.4	3.486
6	2 35 49.39	2.0203	20 29 39.6	8.379	6	4 17 2.97	2.1944	25 17 44.0	3.367
7	2 37 50.72	2.0239	20 37 59.7	8.290	7	4 19 14.73	2.1976	25 21 2.4	3.247
8	2 39 52.26	2.0275	20 46 14.4	8.201	8	4 21 26.68	2.2007	25 24 13.6	3.126
9	2 41 54.02	2.0312	20 54 23.8	8.112	9	4 23 38.82	2.2038	25 27 17.5	3.004
10	2 43 56.00	2.0348	21 2 27.8	8.021	10	4 25 51.14	2.2069	25 30 14.1	2.883
11	2 45 58.20	2.0384	21 10 26.3	7.930	11	4 28 3.65	2.2100	25 33 3.4	2.761
12	2 48 0.61	2.0420	21 18 19.4	7.838	12	4 30 16.34	2.2130	25 35 45.4	2.637
13	2 50 3.24	2.0458	21 26 6.9	7.745	13	4 32 29.20	2.2158	25 38 19.9	2.513
14	2 52 6.10	2.0496	21 33 48.8	7.652	14	4 34 42.24	2.2187	25 40 47.0	2.390
15	2 54 9.19	2.0533	21 41 25.2	7.559	15	4 36 55.45	2.2216	25 43 6.7	2.266
16	2 56 12.50	2.0570	21 48 55.9	7.464	16	4 39 8.83	2.2243	25 45 18.9	2.140
17	2 58 16.03	2.0607	21 56 20.8	7.368	17	4 41 22.37	2.2271	25 47 23.5	2.014
18	3 0 19.78	2.0644	22 3 40.0	7.272	18	4 43 36.08	2.2298	25 49 20.6	1.889
19	3 2 23.76	2.0682	22 10 53.4	7.175	19	4 45 49.95	2.2324	25 51 10.2	1.762
20	3 4 27.96	2.0719	22 18 1.0	7.078	20	4 48 3.97	2.2349	25 52 5.1	1.635
21	3 6 32.39	2.0757	22 25 2.8	6.981	21	4 50 18.14	2.2374	25 54 26.4	1.507
22	3 8 37.05	2.0795	22 31 58.7	6.882	22	4 52 32.46	2.2399	25 55 53.0	1.379
23	3 10 41.93	2.0833	N.22 38 48.6	6.783	23	4 54 46.93	2.2423	N.25 57 11.9	1.250
SUNDAY 10.					TUESDAY 12.				
0	3 12 47.04	2.0870	N.22 45 32.5	6.683	0	4 57 1.54	2.2447	N.25 58 23.2	1.124
1	3 14 52.37	2.0908	22 52 10.4	6.581	1	4 59 16.29	2.2470	25 59 26.8	0.994
2	3 16 57.93	2.0946	22 58 42.2	6.479	2	5 1 31.18	2.2492	26 0 22.5	0.863
3	3 19 3.72	2.0983	23 5 7.9	6.377	3	5 3 46.20	2.2514	26 1 10.4	0.733
4	3 21 9.73	2.1021	23 11 27.5	6.274	4	5 6 1.35	2.2535	26 1 50.5	0.603
5	3 23 15.97	2.1059	23 17 40.8	6.170	5	5 8 16.62	2.2556	26 2 22.8	0.473
6	3 25 22.44	2.1097	23 23 47.9	6.066	6	5 10 32.02	2.2577	26 2 47.3	0.342
7	3 27 29.13	2.1134	23 29 48.7	5.961	7	5 12 47.54	2.2598	26 3 3.9	0.211
8	3 29 36.04	2.1171	23 35 43.2	5.856	8	5 15 3.17	2.2614	26 3 12.6	+0.078
9	3 31 43.18	2.1208	23 41 31.4	5.750	9	5 17 18.91	2.2633	26 3 13.3	-0.054
10	3 33 50.54	2.1245	23 47 13.2	5.643	10	5 19 34.75	2.2649	26 3 6.1	0.186
11	3 35 58.12	2.1283	23 52 48.5	5.534	11	5 21 50.70	2.2667	26 2 51.0	0.318
12	3 38 5.93	2.1320	23 58 17.3	5.426	12	5 24 6.75	2.2683	26 2 27.9	0.452
13	3 40 13.96	2.1357	24 3 39.6	5.317	13	5 26 22.90	2.2698	26 1 56.8	0.585
14	3 42 22.21	2.1393	24 8 55.4	5.208	14	5 28 39.13	2.2713	26 1 17.7	0.716
15	3 44 30.67	2.1428	24 14 4.6	5.097	15	5 30 55.45	2.2728	26 0 30.7	0.851
16	3 46 39.35	2.1465	24 19 7.1	4.986	16	5 33 11.86	2.2741	25 59 35.6	0.986
17	3 48 48.25	2.1501	24 24 2.9	4.875	17	5 35 28.34	2.2753	25 58 32.4	1.120
18	3 50 57.36	2.1537	24 28 52.1	4.763	18	5 37 44.90	2.2766	25 57 21.2	1.254
19	3 53 6.69	2.1573	24 33 34.5	4.650	19	5 40 1.53	2.2778	25 56 1.9	1.389
20	3 55 16.23	2.1609	24 38 10.1	4.536	20	5 42 18.23	2.2788	25 54 34.5	1.523
21	3 57 25.98	2.1643	24 42 38.8	4.421	21	5 44 34.99	2.2798	25 52 59.1	1.658
22	3 59 35.94	2.1678	24 47 0.6	4.307	22	5 46 51.81	2.2807	25 51 15.6	1.793
23	4 1 46.11	2.1713	24 51 15.6	4.192	23	5 49 8.68	2.2816	25 49 23.9	1.928
24	4 3 56.49	2.1747	N.24 55 23.7	4.078	24	5 51 25.60	2.2824	N.25 47 24.1	2.064

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 13.					FRIDAY 15.				
0	5 51 25.60	2.9894	N.25° 47' 24.1"	2.064	0	7 40 40.86	2.9489	N.21° 34' 3.6"	8.385
1	5 53 42.57	2.9899	25 45 16.2	2.199	1	7 42 55.69	2.9499	21 25 36.8	8.507
2	5 55 59.58	2.9908	25 43 0.2	2.335	2	7 45 10.40	2.9443	21 17 2.8	8.629
3	5 58 16.63	2.9945	25 40 36.0	2.471	3	7 47 25.00	2.9493	21 8 21.5	8.748
4	6 0 33.72	2.9950	25 38 3.7	2.606	4	7 49 39.48	2.9403	20 59 33.0	8.868
5	6 2 50.83	2.9954	25 35 23.3	2.741	5	7 51 53.84	2.9383	20 50 37.4	8.987
6	6 5 7.97	2.9958	25 32 34.8	2.877	6	7 54 8.08	2.9363	20 41 34.6	9.106
7	6 7 25.13	2.9968	25 29 38.1	3.012	7	7 56 22.20	2.9349	20 32 24.7	9.223
8	6 9 42.31	2.9984	25 26 33.3	3.148	8	7 58 36.19	2.9329	20 23 7.9	9.339
9	6 11 59.50	2.9996	25 23 20.3	3.284	9	8 0 50.06	2.9301	20 13 44.1	9.455
10	6 14 16.70	2.9987	25 19 59.2	3.419	10	8 3 3.80	2.9279	20 4 13.3	9.571
11	6 16 33.90	2.9987	25 16 30.0	3.555	11	8 5 17.41	2.9258	19 54 35.6	9.685
12	6 18 51.11	2.9987	25 12 52.6	3.691	12	8 7 30.90	2.9237	19 44 51.1	9.798
13	6 21 8.31	2.9987	25 9 7.1	3.826	13	8 9 44.26	2.9215	19 34 59.8	9.911
14	6 23 25.51	2.9986	25 5 13.5	3.962	14	8 11 57.48	2.9193	19 25 1.7	10.023
15	6 25 42.70	2.9983	25 1 11.7	4.097	15	8 14 10.58	2.9179	19 14 57.0	10.134
16	6 27 59.87	2.9980	24 57 1.8	4.232	16	8 16 23.55	2.9159	19 4 45.6	10.245
17	6 30 17.02	2.9957	24 52 43.9	4.366	17	8 18 36.38	2.9138	18 54 27.6	10.355
18	6 32 34.16	2.9954	24 48 17.9	4.501	18	8 20 49.08	2.9108	18 44 3.0	10.463
19	6 34 51.27	2.9949	24 43 43.8	4.636	19	8 23 1.65	2.9083	18 33 32.0	10.571
20	6 37 8.35	2.9943	24 39 1.6	4.770	20	8 25 14.06	2.9061	18 22 54.5	10.678
21	6 39 25.39	2.9937	24 34 11.4	4.903	21	8 27 26.38	2.9039	18 12 10.6	10.784
22	6 41 42.39	2.9930	24 29 13.2	5.037	22	8 29 38.55	2.9017	18 1 20.4	10.889
23	6 43 59.35	2.9924	N.24 24 6.9	5.172	23	8 31 50.58	2.1994	N.17 50 23.9	10.992
THURSDAY 14.					SATURDAY 16.				
0	6 46 16.28	2.9917	N.24 18 52.6	5.306	0	8 34 2.48	2.1979	N.17 39 21.3	11.095
1	6 48 33.16	2.9906	24 13 30.3	5.438	1	8 36 14.25	2.1950	17 28 12.5	11.198
2	6 50 49.98	2.9790	24 8 0.1	5.570	2	8 38 25.88	2.1926	17 16 57.5	11.300
3	6 53 6.75	2.9790	24 2 21.9	5.709	3	8 40 37.38	2.1906	17 5 36.5	11.400
4	6 55 23.46	2.9780	23 56 35.8	5.835	4	8 42 48.75	2.1884	16 54 9.5	11.499
5	6 57 40.11	2.9769	23 50 41.7	5.967	5	8 44 59.99	2.1862	16 42 36.6	11.596
6	6 59 56.69	2.9757	23 44 39.7	6.098	6	8 47 11.10	2.1841	16 30 57.9	11.693
7	7 2 13.20	2.9746	23 38 29.9	6.229	7	8 49 22.08	2.1819	16 19 13.4	11.790
8	7 4 29.64	2.9735	23 32 12.2	6.360	8	8 51 32.93	2.1797	16 7 23.1	11.887
9	7 6 46.02	2.9723	23 25 46.7	6.490	9	8 53 43.65	2.1776	15 55 27.0	11.982
10	7 9 2.32	2.9709	23 19 13.4	6.620	10	8 55 54.24	2.1754	15 43 25.3	12.074
11	7 11 18.53	2.9695	23 12 32.3	6.750	11	8 58 4.70	2.1733	15 31 18.1	12.166
12	7 13 34.66	2.9681	23 5 43.4	6.879	12	9 0 15.04	2.1713	15 19 5.4	12.257
13	7 15 50.70	2.9667	22 58 46.8	7.007	13	9 2 25.26	2.1693	15 6 47.2	12.347
14	7 18 6.66	2.9653	22 51 42.5	7.135	14	9 4 35.35	2.1671	14 54 23.7	12.436
15	7 20 22.53	2.9637	22 44 30.6	7.263	15	9 6 45.31	2.1650	14 41 54.9	12.523
16	7 22 38.31	2.9623	22 37 11.0	7.390	16	9 8 55.15	2.1631	14 29 20.9	12.610
17	7 24 53.99	2.9605	22 29 43.8	7.516	17	9 11 4.88	2.1612	14 16 41.7	12.696
18	7 27 9.57	2.9586	22 22 9.1	7.642	18	9 13 14.49	2.1592	14 3 57.4	12.781
19	7 29 25.05	2.9572	22 14 26.8	7.767	19	9 15 23.98	2.1572	13 51 8.0	12.864
20	7 31 40.43	2.9554	22 6 37.0	7.892	20	9 17 33.35	2.1553	13 38 13.7	12.946
21	7 33 55.70	2.9536	21 58 39.8	8.016	21	9 19 42.61	2.1534	13 25 14.5	13.027
22	7 36 10.86	2.9518	21 50 35.1	8.140	22	9 21 51.76	2.1516	13 12 10.5	13.107
23	7 38 25.91	2.9500	21 42 23.0	8.263	23	9 24 0.80	2.1497	13 59 1.7	13.186
24	7 40 40.86	2.9489	N.21 34 3.6	8.385	24	9 26 9.73	2.1479	N.12 45 48.2	13.263

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 17.					TUESDAY 19.				
0	9 26 9.73	2.1479	N. 12° 45' 48.2"	13.963	0	11 8 1.24	2.1183	N. 1° 3' 38.6"	15.480
1	9 28 18.55	2.1489	12 32 30.1	13.339	1	11 10 8.24	2.1179	0 48 9.4	15.499
2	9 30 27.27	2.1445	12 19 7.5	13.415	2	11 12 15.30	2.1181	0 32 39.5	15.503
3	9 32 35.89	2.1428	12 5 40.3	13.490	3	11 14 22.41	2.1190	0 17 9.0	15.512
4	9 34 44.41	2.1419	11 52 8.7	13.568	4	11 16 29.58	2.1199	N. 0 1 38.0	15.590
5	9 36 52.83	2.1395	11 38 32.8	13.634	5	11 18 36.80	2.1208	S. 0 13 53.4	15.567
6	9 39 1.15	2.1378	11 24 52.6	13.705	6	11 20 44.08	2.1219	0 29 25.2	15.539
7	9 41 9.37	2.1363	11 11 8.2	13.774	7	11 22 51.43	2.1239	0 44 57.3	15.536
8	9 43 17.51	2.1349	10 57 19.7	13.849	8	11 24 58.86	2.1244	1 0 29.5	15.538
9	9 45 25.56	2.1334	10 43 27.2	13.908	9	11 27 6.36	2.1257	1 16 1.8	15.538
10	9 47 33.52	2.1300	10 29 30.8	13.973	10	11 29 13.94	2.1271	1 31 34.0	15.537
11	9 49 41.40	2.1307	10 15 30.4	14.038	11	11 31 21.61	2.1285	1 47 6.2	15.535
12	9 51 49.20	2.1293	10 1 26.2	14.101	12	11 33 29.36	2.1299	2 2 38.2	15.531
13	9 53 56.92	2.1280	9 47 18.3	14.168	13	11 35 37.20	2.1315	2 18 9.9	15.525
14	9 56 4.56	2.1268	9 33 6.7	14.233	14	11 37 45.14	2.1339	2 33 41.2	15.518
15	9 58 12.13	2.1256	9 18 51.5	14.282	15	11 39 53.18	2.1348	2 49 12.1	15.510
16	10 0 19.63	2.1244	9 4 32.8	14.341	16	11 42 1.32	2.1366	3 4 42.4	15.500
17	10 2 27.06	2.1233	8 50 10.6	14.398	17	11 44 9.57	2.1384	3 20 12.1	15.489
18	10 4 34.42	2.1222	8 35 45.1	14.453	18	11 46 17.93	2.1403	3 35 41.1	15.476
19	10 6 41.72	2.1219	8 21 16.3	14.507	19	11 48 26.40	2.1423	3 51 9.2	15.461
20	10 8 48.96	2.1208	8 6 44.3	14.559	20	11 50 35.00	2.1443	4 6 36.4	15.445
21	10 10 56.15	2.1193	7 52 9.2	14.610	21	11 52 43.72	2.1464	4 22 2.6	15.427
22	10 13 3.28	2.1185	7 37 31.1	14.660	22	11 54 52.57	2.1486	4 37 27.7	15.408
23	10 15 10.37	2.1177	N. 7 22 50.0	14.709	23	11 57 1.55	2.1508	S. 4 52 51.6	15.387
MONDAY 18.					WEDNESDAY 20.				
0	10 17 17.41	2.1170	N. 7 8 6.0	14.757	0	11 59 10.66	2.1530	S. 5 8 14.2	15.365
1	10 19 24.41	2.1169	6 53 19.2	14.803	1	12 1 19.91	2.1554	5 23 35.4	15.349
2	10 21 31.36	2.1155	6 38 29.7	14.847	2	12 3 29.31	2.1579	5 38 55.2	15.317
3	10 23 38.27	2.1140	6 23 37.6	14.890	3	12 5 38.86	2.1604	5 54 13.4	15.280
4	10 25 45.15	2.1145	6 8 42.9	14.939	4	12 7 48.56	2.1629	6 9 29.9	15.261
5	10 27 52.01	2.1141	5 53 45.7	14.973	5	12 9 58.41	2.1655	6 24 44.7	15.231
6	10 29 58.84	2.1137	5 38 46.1	15.013	6	12 12 8.42	2.1689	6 39 57.6	15.199
7	10 32 5.65	2.1133	5 23 44.2	15.051	7	12 14 18.60	2.1710	6 55 8.6	15.167
8	10 34 12.44	2.1129	5 8 40.0	15.088	8	12 16 28.94	2.1738	7 10 17.6	15.139
9	10 36 19.20	2.1126	4 53 33.7	15.123	9	12 18 39.45	2.1767	7 25 24.4	15.095
10	10 38 25.95	2.1125	4 38 25.3	15.156	10	12 20 50.14	2.1797	7 40 29.0	15.057
11	10 40 32.70	2.1124	4 23 15.0	15.188	11	12 23 1.01	2.1827	7 55 31.3	15.019
12	10 42 39.44	2.1123	4 8 2.8	15.219	12	12 25 12.06	2.1857	8 10 31.3	14.979
13	10 44 46.18	2.1123	3 52 48.7	15.248	13	12 27 23.20	2.1888	8 25 28.8	14.936
14	10 46 52.92	2.1123	3 37 32.9	15.277	14	12 29 34.72	2.1920	8 40 23.6	14.891
15	10 48 59.66	2.1123	3 22 15.5	15.303	15	12 31 46.34	2.1953	8 55 15.7	14.845
16	10 51 6.42	2.1127	3 6 56.5	15.329	16	12 33 58.16	2.1987	9 10 5.0	14.798
17	10 53 13.19	2.1129	2 51 36.0	15.352	17	12 36 10.18	2.2020	9 24 51.5	14.750
18	10 55 19.97	2.1132	2 36 14.2	15.374	18	12 38 22.40	2.2054	9 39 35.0	14.699
19	10 57 26.77	2.1136	2 20 51.1	15.396	19	12 40 34.83	2.2090	9 54 15.4	14.647
20	10 59 33.60	2.1141	2 5 26.7	15.417	20	12 42 47.48	2.2126	10 8 52.7	14.594
21	11 1 40.46	2.1146	1 50 1.1	15.435	21	12 45 0.34	2.2162	10 23 26.7	14.538
22	11 3 47.35	2.1152	1 34 34.5	15.451	22	12 47 13.42	2.2198	10 37 57.3	14.489
23	11 5 54.28	2.1157	1 19 7.0	15.466	23	12 49 26.72	2.2235	10 52 24.5	14.434
24	11 8 1.24	2.1163	N. 1 3 38.6	15.480	24	12 51 40.24	2.2273	S. 11 6 48.2	14.384

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 21.					SATURDAY 23.				
0	12 51 40.24	2.9273	8.11° 6' 48.2"	14.364	0	14 43 41.56	2.4480	8.20° 57' 34.1"	9.085
1	12 53 53.99	2.9312	11 21 8.2	14.303	1	14 46 8.58	2.4527	21 7 10.0	9.531
2	12 56 7.98	2.9351	11 35 24.5	14.340	2	14 48 35.88	2.4573	21 16 37.8	9.365
3	12 58 22.90	2.9390	11 49 37.0	14.176	3	14 51 3.46	2.4620	21 25 57.4	9.258
4	13 0 36.66	2.9430	12 3 45.6	14.109	4	14 53 31.32	2.4666	21 35 8.7	9.120
5	13 2 51.36	2.9470	12 17 50.1	14.041	5	14 55 59.45	2.4711	21 44 11.8	8.968
6	13 5 6.30	2.9511	12 31 50.5	13.973	6	14 58 27.85	2.4756	21 53 6.5	8.841
7	13 7 21.49	2.9552	12 45 46.7	13.901	7	15 0 56.52	2.4801	22 1 52.7	8.689
8	13 9 36.93	2.9594	12 59 38.6	13.829	8	15 3 25.46	2.4845	22 10 30.4	8.557
9	13 11 52.62	2.9637	13 13 26.2	13.755	9	15 5 54.66	2.4888	22 18 59.5	8.413
10	13 14 8.57	2.9680	13 27 9.2	13.679	10	15 8 24.12	2.4932	22 27 19.9	8.268
11	13 16 24.78	2.9722	13 40 47.6	13.603	11	15 10 53.84	2.4974	22 35 31.6	8.121
12	13 18 41.24	2.9766	13 54 21.4	13.523	12	15 13 23.81	2.5016	22 43 34.4	7.973
13	13 20 57.97	2.9811	14 7 50.4	13.443	13	15 15 54.03	2.5057	22 51 28.3	7.824
14	13 23 14.97	2.9855	14 21 14.5	13.360	14	15 18 24.50	2.5098	22 59 13.3	7.674
15	13 25 32.23	2.9899	14 34 33.6	13.277	15	15 20 55.21	2.5138	23 6 49.2	7.523
16	13 27 49.76	2.9944	14 47 47.7	13.193	16	15 23 26.15	2.5177	23 14 16.0	7.371
17	13 30 7.56	2.9990	15 0 56.6	13.105	17	15 25 57.33	2.5216	23 21 33.7	7.218
18	13 32 25.64	2.3037	15 14 0.3	13.017	18	15 28 28.74	2.5253	23 28 42.2	7.064
19	13 34 44.00	2.3082	15 26 58.6	12.927	19	15 31 0.37	2.5290	23 35 41.4	6.908
20	13 37 2.63	2.3128	15 39 51.5	12.836	20	15 33 32.22	2.5327	23 42 31.2	6.759
21	13 39 21.54	2.3176	15 52 38.9	12.743	21	15 36 4.29	2.5362	23 49 11.6	6.594
22	13 41 40.74	2.3223	16 5 20.7	12.649	22	15 38 36.57	2.5397	23 55 42.5	6.437
23	13 44 0.22	2.3270	8.16 17 56.8	12.552	23	15 41 9.06	2.5431	8.24 2 4.0	6.278
FRIDAY 22.					SUNDAY 24.				
0	13 46 19.98	2.3318	8.16 30 27.0	12.454	0	15 43 41.74	2.5463	8.24 8 15.9	6.118
1	13 48 40.03	2.3366	16 42 51.3	12.356	1	15 46 14.61	2.5495	24 14 18.1	5.957
2	13 51 0.37	2.3413	16 55 9.7	12.256	2	15 48 47.68	2.5527	24 20 10.7	5.796
3	13 53 20.99	2.3461	17 7 22.0	12.153	3	15 51 20.94	2.5558	24 25 53.6	5.633
4	13 55 41.90	2.3509	17 19 28.1	12.049	4	15 53 54.38	2.5588	24 31 26.7	5.470
5	13 58 3.10	2.3558	17 31 27.9	11.943	5	15 56 27.98	2.5613	24 36 50.0	5.306
6	14 0 24.60	2.3607	17 43 21.3	11.837	6	15 59 1.74	2.5640	24 42 3.4	5.141
7	14 2 46.39	2.3656	17 55 8.3	11.738	7	16 1 35.66	2.5667	24 47 6.9	4.976
8	14 5 8.47	2.3704	18 6 48.7	11.618	8	16 4 9.74	2.5692	24 52 0.5	4.810
9	14 7 30.84	2.3753	18 18 22.5	11.507	9	16 6 43.96	2.5715	24 56 44.1	4.643
10	14 9 53.51	2.3803	18 29 49.6	11.395	10	16 9 18.32	2.5738	25 1 17.6	4.475
11	14 12 16.47	2.3852	18 41 9.9	11.281	11	16 11 52.82	2.5761	25 5 41.1	4.307
12	14 14 39.73	2.3901	18 52 23.3	11.165	12	16 14 27.45	2.5782	25 9 54.5	4.138
13	14 17 3.28	2.3949	19 3 29.7	11.048	13	16 17 2.20	2.5801	25 13 57.7	3.969
14	14 19 27.12	2.3998	19 14 29.0	10.939	14	16 19 37.06	2.5818	25 17 50.8	3.800
15	14 21 51.26	2.4047	19 25 21.2	10.809	15	16 22 12.02	2.5835	25 21 33.7	3.630
16	14 24 15.69	2.4096	19 36 6.1	10.687	16	16 24 47.08	2.5851	25 25 6.4	3.459
17	14 26 40.41	2.4144	19 46 43.7	10.564	17	16 27 22.23	2.5866	25 28 28.8	3.288
18	14 29 5.42	2.4193	19 57 13.8	10.439	18	16 29 57.47	2.5879	25 31 41.0	3.117
19	14 31 30.73	2.4242	20 7 36.4	10.313	19	16 32 32.78	2.5891	25 34 42.9	2.945
20	14 33 56.32	2.4290	20 17 51.4	10.187	20	16 35 8.16	2.5902	25 37 34.4	2.779
21	14 36 22.20	2.4337	20 27 58.8	10.058	21	16 37 43.61	2.5912	25 40 15.0	2.600
22	14 38 48.37	2.4385	20 37 58.4	9.928	22	16 40 19.11	2.5921	25 42 46.4	2.427
23	14 41 14.82	2.4433	20 47 50.2	9.797	23	16 42 54.66	2.5928	25 45 6.9	2.255
24	14 43 41.56	2.4480	8.20 57 34.1	9.665	24	16 45 30.24	2.5933	8.25 47 17.0	2.089

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 25.					WEDNESDAY 27.				
0	<sup>h</sup> 16 <sup>m</sup> 45 <sup>s</sup> 30.24	2.5833	8.25° 47' 17.0"	2.089	0	<sup>h</sup> 18 <sup>m</sup> 48 <sup>s</sup> 11.95	2.4737	8.24° 11' 35.1"	5.850
1	16 48 5.85	2.5838	25 49 16.7	1.908	1	18 50 40.22	2.4686	24 5 39.7	5.997
2	16 50 41.49	2.5942	25 51 6.0	1.735	2	18 53 8.18	2.4633	23 59 35.5	6.142
3	16 53 17.15	2.5943	25 52 44.9	1.562	3	18 55 35.82	2.4581	23 53 22.6	6.286
4	16 55 52.81	2.5943	25 54 13.4	1.388	4	18 58 3.15	2.4528	23 47 1.2	6.430
5	16 58 28.47	2.5942	25 55 31.5	1.214	5	19 0 30.16	2.4476	23 40 31.3	6.569
6	17 1 4.12	2.5941	25 56 39.1	1.040	6	19 2 56.86	2.4423	23 33 52.9	6.709
7	17 3 39.76	2.5937	25 57 36.3	0.867	7	19 5 23.23	2.4368	23 27 6.2	6.848
8	17 6 15.37	2.5933	25 58 23.1	0.694	8	19 7 49.27	2.4313	23 20 11.2	6.986
9	17 8 50.94	2.5925	25 58 59.6	0.521	9	19 10 14.98	2.4257	23 13 7.9	7.123
10	17 11 26.47	2.5918	25 59 25.6	0.347	10	19 12 40.35	2.4200	23 5 56.5	7.267
11	17 14 1.96	2.5910	25 59 41.2	0.174	11	19 15 5.38	2.4144	22 58 37.1	7.390
12	17 16 37.39	2.5900	25 59 46.5	-0.002	12	19 17 30.08	2.4088	22 51 9.7	7.522
13	17 19 12.76	2.5888	25 59 41.4	+0.173	13	19 19 54.44	2.4030	22 43 34.4	7.653
14	17 21 48.05	2.5875	25 59 25.9	0.345	14	19 22 18.44	2.3971	22 35 51.3	7.783
15	17 24 23.26	2.5863	25 59 0.0	0.517	15	19 24 42.09	2.3912	22 28 0.5	7.911
16	17 26 58.39	2.5847	25 58 23.8	0.689	16	19 27 5.39	2.3854	22 20 2.0	8.038
17	17 29 33.42	2.5830	25 57 37.3	0.860	17	19 29 28.34	2.3795	22 11 55.9	8.164
18	17 32 8.34	2.5811	25 56 40.6	1.031	18	19 31 50.93	2.3735	22 3 42.3	8.288
19	17 34 43.15	2.5792	25 55 33.6	1.202	19	19 34 13.16	2.3676	21 55 21.3	8.411
20	17 37 17.85	2.5773	25 54 16.3	1.373	20	19 36 35.04	2.3617	21 46 53.0	8.533
21	17 39 52.42	2.5750	25 52 48.8	1.543	21	19 38 56.56	2.3557	21 38 17.4	8.653
22	17 42 26.85	2.5727	25 51 11.2	1.712	22	19 41 17.72	2.3496	21 29 34.6	8.779
23	17 45 1.14	2.5703	8.25 49 23.4	1.881	23	19 43 38.51	2.3435	8.21 20 44.8	8.898
TUESDAY 26.					THURSDAY 28.				
0	17 47 35.28	2.5677	8.25 47 25.5	2.049	0	19 45 58.94	2.3375	8.21 11 48.0	9.004
1	17 50 9.26	2.5649	25 45 17.5	2.217	1	19 48 19.01	2.3314	21 2 44.3	9.119
2	17 52 43.07	2.5622	25 42 59.5	2.383	2	19 50 38.71	2.3252	20 53 33.7	9.232
3	17 55 16.72	2.5593	25 40 31.5	2.550	3	19 52 58.04	2.3191	20 44 16.4	9.343
4	17 57 50.19	2.5563	25 37 53.5	2.716	4	19 55 17.00	2.3130	20 34 52.5	9.453
5	18 0 23.47	2.5531	25 35 5.6	2.882	5	19 57 35.60	2.3069	20 25 22.0	9.562
6	18 2 56.56	2.5498	25 32 7.7	3.046	6	19 59 53.83	2.3008	20 15 45.0	9.670
7	18 5 29.45	2.5464	25 29 0.0	3.209	7	20 2 11.69	2.2947	20 6 1.6	9.776
8	18 8 2.13	2.5430	25 25 42.6	3.373	8	20 4 29.19	2.2886	19 56 11.9	9.880
9	18 10 34.60	2.5393	25 22 15.4	3.534	9	20 6 46.32	2.2824	19 46 16.0	9.982
10	18 13 6.85	2.5356	25 18 38.5	3.695	10	20 9 3.08	2.2763	19 36 14.0	10.084
11	18 15 38.87	2.5317	25 14 52.0	3.855	11	20 11 19.47	2.2702	19 26 5.9	10.185
12	18 18 10.66	2.5278	25 10 55.9	4.014	12	20 13 35.50	2.2641	19 15 51.8	10.283
13	18 20 42.21	2.5238	25 6 50.3	4.173	13	20 15 51.16	2.2580	19 5 31.9	10.380
14	18 23 13.52	2.5197	25 2 35.1	4.332	14	20 18 6.46	2.2519	18 55 6.2	10.477
15	18 25 44.58	2.5156	24 58 10.5	4.488	15	20 20 21.39	2.2458	18 44 34.7	10.572
16	18 28 15.39	2.5113	24 53 36.5	4.643	16	20 22 35.96	2.2397	18 33 57.6	10.664
17	18 30 45.93	2.5068	24 48 53.3	4.798	17	20 24 50.16	2.2337	18 23 15.0	10.756
18	18 33 16.20	2.5023	24 44 0.8	4.952	18	20 27 4.00	2.2277	18 12 26.9	10.846
19	18 35 46.20	2.4978	24 38 59.1	5.104	19	20 29 17.48	2.2217	18 1 33.5	10.934
20	18 38 15.93	2.4931	24 33 46.3	5.256	20	20 31 30.60	2.2157	17 50 34.8	11.022
21	18 40 45.37	2.4883	24 28 28.4	5.407	21	20 33 43.36	2.2097	17 39 30.9	11.108
22	18 43 14.52	2.4834	24 22 59.5	5.556	22	20 35 55.76	2.2036	17 28 21.9	11.192
23	18 45 43.38	2.4786	24 17 21.7	5.703	23	20 38 7.81	2.1979	17 17 7.9	11.275
24	18 48 11.95	2.4737	8.24 11 35.1	5.850	24	20 40 19.51	2.1920	8.17 5 48.9	11.357

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 29.					SUNDAY 31.				
0	<sup>h</sup> 20 <sup>m</sup> 40 <sup>s</sup> 19.51	2.1980	S. 17° 5' 48.9"	11.357	0	<sup>h</sup> 22 <sup>m</sup> 19 <sup>s</sup> 34.13	1.9633	S. 6° 52' 47.3"	13.601
1	20 42 30.85	2.1981	16 54 25.1	11.477	1	22 21 31.83	1.9699	6 39 5.3	13.710
2	20 44 41.84	2.1983	16 42 56.5	11.515	2	22 23 29.32	1.9685	6 25 22.1	13.798
3	20 46 52.49	2.1746	16 31 23.3	11.599	3	22 25 26.61	1.9633	6 11 37.9	13.745
4	20 49 2.79	2.1688	16 19 45.5	11.668	4	22 27 23.71	1.9509	5 57 52.7	13.780
5	20 51 12.75	2.1631	16 8 3.2	11.748	5	22 29 20.63	1.9471	5 44 6.7	13.773
6	20 53 22.36	2.1573	15 56 16.5	11.814	6	22 31 17.36	1.9440	5 30 10.9	13.786
7	20 55 31.63	2.1517	15 44 25.5	11.886	7	22 33 13.91	1.9410	5 16 32.4	13.798
8	20 57 40.57	2.1469	15 32 30.2	11.957	8	22 35 10.28	1.9380	5 2 44.1	13.810
9	20 59 49.17	2.1406	15 20 30.7	12.028	9	22 37 6.47	1.9361	4 48 55.2	13.819
10	21 1 57.44	2.1351	15 8 27.1	12.093	10	22 39 2.49	1.9333	4 35 5.8	13.888
11	21 4 5.38	2.1986	14 56 19.5	12.159	11	22 40 58.35	1.9297	4 21 15.9	13.836
12	21 6 12.91	2.1942	14 44 8.0	12.223	12	22 42 54.05	1.9270	4 7 25.5	13.843
13	21 8 20.28	2.1187	14 31 52.7	12.287	13	22 44 49.59	1.9244	3 53 34.8	13.848
14	21 10 27.24	2.1133	14 19 33.6	12.349	14	22 46 44.98	1.9218	3 39 43.8	13.853
15	21 12 33.88	2.1080	14 7 10.8	12.410	15	22 48 40.21	1.9193	3 25 52.5	13.857
16	21 14 40.20	2.1028	13 54 44.4	12.469	16	22 50 35.29	1.9168	3 12 1.0	13.859
17	21 16 46.21	2.0976	13 42 14.5	12.527	17	22 52 30.23	1.9146	2 58 9.4	13.860
18	21 18 51.91	2.0924	13 29 41.2	12.583	18	22 54 25.04	1.9123	2 44 17.8	13.860
19	21 20 57.30	2.0873	13 17 4.6	12.638	19	22 56 19.71	1.9101	2 30 26.2	13.860
20	21 23 2.39	2.0822	13 4 24.6	12.693	20	22 58 14.25	1.9078	2 16 34.6	13.860
21	21 25 7.17	2.0772	12 51 41.4	12.746	21	23 0 8.65	1.9057	2 2 43.1	13.857
22	21 27 11.65	2.0722	12 38 55.1	12.797	22	23 2 2.93	1.9037	1 48 51.8	13.853
23	21 29 15.84	2.0673	S. 12 26 5.8	12.846	23	23 3 57.10	1.9018	S. 1 35 0.7	13.849
SATURDAY 30.					MONDAY, SEPTEMBER 1.				
0	21 31 19.73	2.0624	S. 12 13 13.6	12.894	0	23 5 51.15	1.8999	S. 1 21 9.9	13.843
1	21 33 23.33	2.0577	12 0 18.5	12.942	PHASES OF THE MOON.				
2	21 35 26.65	2.0529	11 47 20.5	12.989					
3	21 37 29.68	2.0489	11 34 19.8	13.033					
4	21 39 32.43	2.0436	11 21 16.5	13.077					
5	21 41 34.91	2.0391	11 8 10.6	13.119	$\bigcirc$ Full Moon, . . . <sup>d</sup> 1 <sup>h</sup> 19 <sup>m</sup> 12.3 $\text{☾}$ Last Quarter, . . . 9 14 8.7 $\bullet$ New Moon, . . . 17 8 10.5 $\text{☾}$ First Quarter, . . . 24 3 11.9 $\bigcirc$ Full Moon, . . . 31 6 57.8				
6	21 43 37.12	2.0345	10 55 2.2	13.160					
7	21 45 39.05	2.0300	10 41 51.4	13.200					
8	21 47 40.72	2.0257	10 28 38.2	13.238					
9	21 49 42.13	2.0213	10 15 22.8	13.275	$\text{☾}$ Apogee, . . . . . <sup>d</sup> 9 <sup>h</sup> 9.5 $\text{☾}$ Perigee, . . . . . 21 18.6				
10	21 51 43.28	2.0170	10 2 5.2	13.319					
11	21 53 44.17	2.0128	9 48 45.4	13.347					
12	21 55 44.81	2.0086	9 35 23.5	13.381					
13	21 57 45.20	2.0045	9 21 59.7	13.413					
14	21 59 45.35	2.0004	9 8 34.0	13.444					
15	22 1 45.25	1.9963	8 55 6.4	13.474					
16	22 3 44.91	1.9924	8 41 37.1	13.503					
17	22 5 44.34	1.9887	8 28 6.1	13.531					
18	22 7 43.55	1.9849	8 14 33.4	13.557					
19	22 9 42.53	1.9811	8 0 59.2	13.582					
20	22 11 41.28	1.9773	7 47 23.5	13.607					
21	22 13 39.81	1.9737	7 33 46.4	13.630					
22	22 15 38.12	1.9702	7 20 7.9	13.652					
23	22 17 36.23	1.9667	7 6 28.2	13.672					
24	22 19 34.13	1.9633	S. 6 52 47.3	13.691					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Antares	W.	50° 46' 24"	9419	52° 29' 41"	9423	54° 12' 43"	9433	55° 55' 31"	9443
	Jupiter	E.	42 38 16	9423	40 55 14	9436	39 12 30	9448	37 30 4	9469
	Saturn	E.	77 7 21	9459	75 25 0	9463	73 42 54	9474	72 1 4	9485
	Mars	E.	96 34 49	9641	94 56 50	9659	93 19 5	9669	91 41 34	9679
	α Arietis	E.	97 8 5	9428	95 25 10	9437	93 42 28	9448	92 0 1	9458
2	Antares	W.	64 25 43	9499	66 6 57	9511	67 47 55	9523	69 28 36	9535
	Saturn	E.	63 35 58	9546	61 55 49	9560	60 15 59	9574	58 36 28	9588
	α Arietis	E.	83 31 34	9514	81 50 40	9526	80 10 3	9539	78 29 44	9559
	Mars	E.	83 37 40	9731	82 1 41	9744	80 25 59	9756	78 50 33	9769
	Antares	W.	77 47 40	9599	79 26 36	9613	81 5 13	9626	82 43 32	9640
3	Saturn	E.	50 23 55	9665	48 46 28	9689	47 9 24	9699	45 32 43	9716
	α Arietis	E.	70 12 33	9617	68 34 1	9630	66 55 47	9644	65 17 52	9658
	Mars	E.	70 57 50	9838	69 24 12	9853	67 50 53	9868	66 17 53	9883
	α Aquilæ	W.	44 37 57	4034	45 49 3	3970	47 1 6	3925	48 14 0	3890
	Saturn	E.	37 35 26	9815	36 1 18	9838	34 27 40	9863	32 54 32	9887
4	α Arietis	E.	57 13 0	9729	55 36 58	9743	54 1 15	9757	52 25 51	9772
	Mars	E.	58 37 42	9960	57 6 39	9975	55 35 55	9991	54 5 31	3007
	Aldebaran	E.	89 48 50	9763	88 13 34	9778	86 38 37	9793	85 3 58	9805
	α Aquilæ	W.	54 28 25	3723	55 44 48	3709	57 1 33	3684	58 18 37	3669
	α Arietis	E.	44 33 39	9845	43 0 10	9859	41 26 59	9874	39 54 7	9889
5	Mars	E.	46 38 35	3090	45 10 13	3107	43 42 12	3124	42 14 32	3143
	Aldebaran	E.	77 15 7	9873	75 42 14	9887	74 9 38	9900	72 37 19	9914
	α Aquilæ	W.	64 47 27	3618	66 5 42	3611	67 24 4	3607	68 42 31	3603
	Fomalhaut	W.	40 31 23	3989	41 43 20	3930	42 56 9	3884	44 9 45	3843
	Jupiter	W.	23 51 43	9975	25 22 27	9974	26 53 12	9975	28 23 56	9977
6	Mars	E.	35 1 40	3937	33 36 15	3958	32 11 14	3980	30 46 39	3303
	Aldebaran	E.	65 0 0	9979	63 29 21	9999	61 58 58	3005	60 28 51	3018
	Sun	E.	129 34 40	3963	128 9 44	3974	126 45 2	3986	125 20 34	3996
	α Aquilæ	W.	75 15 28	3597	76 34 6	3598	77 52 43	3598	79 11 19	3599
	Fomalhaut	W.	50 26 53	3996	51 43 44	3976	53 0 57	3957	54 18 30	3941
7	Jupiter	W.	35 56 34	9998	37 26 49	3003	38 56 58	3008	40 27 1	3013
	Aldebaran	E.	53 2 9	3079	51 33 34	3091	50 5 14	3103	48 37 8	3115
	Sun	E.	118 21 22	3348	116 58 6	3357	115 35 0	3365	114 12 3	3372
	Fomalhaut	W.	60 50 12	3577	62 9 11	3567	63 28 21	3558	64 47 41	3550
	Jupiter	W.	47 55 53	3033	49 25 25	3037	50 54 52	3039	52 24 16	3043
8	α Pegasi	W.	38 4 16	3447	39 25 39	3488	40 47 24	3499	42 9 30	3503
	Aldebaran	E.	41 20 24	3179	39 53 50	3193	38 27 32	3206	37 1 30	3221
	Pollux	E.	82 53 31	3069	81 24 44	3074	79 56 3	3078	78 27 27	3082
	Sun	E.	107 19 29	3407	105 57 20	3419	104 35 17	3417	103 13 20	3429
	Fomalhaut	W.	71 26 26	3515	72 46 33	3509	74 6 47	3504	75 27 7	3496
9	Jupiter	W.	59 50 32	3051	61 19 42	3051	62 48 52	3051	64 18 2	3050
	α Pegasi	W.	49 4 2	3339	50 27 37	3322	51 51 23	3313	53 15 20	3304
	Saturn	W.	25 31 52	3973	26 56 36	3953	28 21 43	3936	29 47 10	3921
	Pollux	E.	71 5 36	3098	69 37 24	3100	68 9 14	3101	66 41 5	3109
	Sun	E.	96 24 38	3436	95 3 2	3437	93 41 27	3438	92 19 53	3439

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Antares W.	57 38 4	9454	59 20 22	9465	61 2 25	9476	62 44 12	9487
	Jupiter E.	35 47 58	9477	34 6 13	9493	32 24 50	9510	30 43 50	9528
	Saturn E.	70 19 30	9497	68 38 12	9508	66 57 10	9520	65 16 25	9533
	Mars E.	90 4 17	9563	88 27 15	9585	86 50 28	9706	85 13 56	9718
	α Arietis E.	90 17 49	9469	88 35 52	9480	86 54 10	9491	85 12 44	9502
2	Antares W.	71 9 0	9548	72 49 6	9561	74 28 55	9574	76 8 26	9586
	Saturn E.	56 57 17	9602	55 18 25	9618	53 39 54	9633	52 1 44	9649
	α Arietis E.	76 49 43	9564	75 9 59	9577	73 30 32	9590	71 51 23	9604
	Mars E.	77 15 25	9789	75 40 34	9796	74 6 1	9810	72 31 40	9824
3	Antares W.	84 21 33	9653	85 59 16	9666	87 36 41	9680	89 13 48	9693
	Saturn E.	43 56 25	9735	42 20 32	9754	40 45 4	9774	39 10 2	9794
	α Arietis E.	63 40 16	9679	62 2 59	9687	60 26 1	9700	58 49 21	9714
	Mars E.	64 45 12	9896	63 12 50	9913	61 40 48	9928	60 9 5	9944
4	α Aquilæ W.	49 27 40	9840	50 42 1	9855	51 56 58	9774	53 12 27	3746
	Saturn E.	31 21 56	9914	29 49 55	9943	28 18 31	9975	26 47 47	3011
	α Arietis E.	50 50 47	9787	49 16 2	9801	47 41 36	9815	46 7 28	9830
	Mars E.	52 35 27	3093	51 5 43	3040	49 36 20	3056	48 7 17	3073
	Aldebaran E.	83 29 36	9818	81 55 32	9839	80 21 46	9846	78 48 18	9859
5	α Aquilæ W.	59 35 57	3655	60 53 32	3643	62 11 20	3633	63 29 19	3624
	α Arietis E.	38 21 34	9904	36 49 20	9919	35 17 25	9935	33 45 50	9950
	Mars E.	40 47 14	3160	39 20 17	3178	37 53 42	3197	36 27 29	3217
	Aldebaran E.	71 5 18	9927	69 33 34	9940	68 2 6	9954	66 30 55	9968
6	α Aquilæ W.	70 1 2	3600	71 19 36	3598	72 38 12	3597	73 56 50	3597
	Fomalhaut W.	45 24 3	3806	46 38 59	3774	47 54 28	3748	49 10 27	3730
	Jupiter W.	29 54 37	9981	31 25 14	9985	32 55 46	9989	34 26 13	9993
	Mars E.	29 22 31	3398	27 58 52	3355	26 35 44	3385	25 13 10	3417
	Aldebaran E.	58 59 0	3030	57 29 24	3043	56 0 4	3055	54 30 59	3067
	Sun E.	123 56 20	3308	122 32 18	3319	121 8 28	3328	119 44 49	3338
7	α Aquilæ W.	80 29 54	3601	81 48 27	3604	83 6 57	3607	84 25 24	3610
	Fomalhaut W.	55 36 20	3896	56 54 26	3811	58 12 48	3808	59 31 24	3807
	Jupiter W.	41 56 58	3017	43 26 50	3022	44 56 36	3026	46 26 17	3030
	Aldebaran E.	47 9 17	3198	45 41 41	3140	44 14 20	3153	42 47 14	3166
	Sun E.	112 49 15	3380	111 26 36	3388	110 4 6	3395	108 41 44	3401
8	Fomalhaut W.	66 7 10	3542	67 26 48	3535	68 46 33	3528	70 6 26	3522
	Jupiter W.	53 53 36	3045	55 22 53	3047	56 52 8	3048	58 21 21	3050
	α Pegasi W.	43 31 54	3379	44 54 34	3366	46 17 29	3353	47 40 39	3342
	Aldebaran E.	35 35 46	3237	34 10 21	3255	32 45 17	3274	31 20 35	3294
	Pollux E.	76 58 56	3067	75 30 30	3091	74 2 9	3093	72 32 51	3096
	Sun E.	101 51 28	3436	100 29 41	3439	99 7 57	3431	97 46 10	3434
9	Fomalhaut W.	76 47 33	3492	78 8 6	3487	79 28 45	3482	80 49 29	3477
	Jupiter W.	65 47 13	3049	67 16 25	3047	68 45 39	3046	70 14 55	3044
	α Pegasi W.	54 39 27	3394	56 3 45	3386	57 28 13	3377	58 52 51	3370
	Saturn W.	31 12 54	9908	32 38 54	9918	34 5 9	9913	35 31 38	9913
	Pollux E.	65 12 58	3102	63 44 51	3102	62 16 44	3102	60 48 37	3101
	Sun E.	90 58 19	3438	89 36 45	3437	88 15 10	3436	86 53 34	3434



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Fomalhaut W.	82° 10' 19"	3471	83° 31' 15"	3466	84° 52' 17"	3461	86° 13' 25"	3455
	Jupiter W.	71 44 13	3049	73 13 34	3038	74 42 59	3024	76 12 29	3030
	α Pegasi W.	60 17 38	3261	61 42 35	3253	63 7 42	3245	64 32 58	3236
	Saturn W.	36 58 19	3163	38 25 12	3153	39 52 17	3144	41 19 33	3134
	Pollux E.	59 20 29	3100	57 52 19	3088	56 24 7	3086	54 55 53	3084
	Sun E.	85 31 56	3431	84 10 15	3428	82 48 30	3424	81 26 41	3421
11	Jupiter W.	83 41 27	3004	85 11 35	2997	86 41 52	2989	88 12 17	2983
	α Pegasi W.	71 41 49	3193	73 8 7	3184	74 34 35	3175	76 1 14	3165
	Saturn W.	48 38 43	3088	50 7 7	3079	51 35 42	3069	53 4 29	3059
	α Arietis W.	28 14 44	3093	29 43 2	3082	31 11 34	3069	32 40 21	3058
	Mars W.	23 52 26	3461	25 13 34	3430	26 35 17	3402	27 57 31	3378
	Pollux E.	47 33 54	3078	46 5 18	3074	44 36 37	3070	43 7 51	3066
	Sun E.	74 36 20	3393	73 13 56	3386	71 51 24	3379	70 28 44	3373
12	Jupiter W.	95 46 52	2940	97 18 20	2931	98 50 0	2920	100 21 53	2910
	Saturn W.	60 31 34	3006	62 1 39	2995	63 31 58	2984	65 2 31	2973
	α Arietis W.	40 7 50	3000	41 38 3	2988	43 8 31	2977	44 39 13	2964
	Mars W.	34 55 11	3275	36 19 52	3257	37 44 54	3239	39 10 17	3222
	Pollux E.	35 42 46	3047	34 13 31	3043	32 44 12	3041	31 14 50	3040
	Sun E.	63 32 58	3325	62 9 16	3315	60 45 22	3305	59 21 16	3294
13	Saturn W.	72 39 1	2911	74 11 6	2898	75 43 28	2884	77 16 7	2871
	α Arietis W.	52 16 41	2901	53 48 59	2888	55 21 33	2874	56 54 25	2861
	Mars W.	46 22 14	3138	47 49 37	3123	49 17 19	3106	50 45 21	3090
	Aldebaran W.	21 24 58	3315	22 48 52	3250	24 14 2	3194	25 40 18	3145
	Sun E.	52 17 22	3233	50 51 52	3220	49 26 7	3207	48 0 6	3194
14	Saturn W.	85 3 41	2803	86 38 5	2789	88 12 47	2775	89 47 47	2761
	α Arietis W.	64 43 8	2799	66 17 47	2777	67 52 45	2763	69 28 2	2749
	Mars W.	58 10 31	3008	59 40 34	2992	61 10 57	2977	62 41 39	2961
	Aldebaran W.	33 4 42	2962	34 35 42	2934	36 7 18	2907	37 39 28	2889
	Sun E.	40 46 0	3194	39 18 20	3110	37 50 23	3096	36 22 9	3083
15	α Arietis W.	77 29 8	2677	79 6 19	2663	80 43 49	2648	82 21 39	2634
	Mars W.	70 20 16	2880	71 53 1	2864	73 26 6	2848	74 59 31	2833
	Aldebaran W.	45 27 55	2771	47 3 1	2751	48 38 33	2739	50 14 31	2713
	Sun E.	28 56 41	3013	27 26 45	3000	25 56 32	2987	24 26 3	2975
19	Sun W.	21 55 5	2636	23 33 11	2624	25 11 33	2615	26 50 8	2607
	Antares E.	80 10 35	2999	78 24 34	2993	76 38 24	2987	74 52 5	2982
20	Sun W.	35 5 29	2576	36 44 57	2572	38 24 31	2568	40 4 10	2565
	Antares E.	65 58 43	2980	64 11 44	2957	62 24 41	2954	60 37 34	2951
21	Sun W.	48 23 23	2553	50 3 22	2553	51 43 22	2553	53 23 22	2553
	Antares E.	51 41 12	2944	49 53 50	2943	48 6 27	2943	46 19 4	2943
	α Aquilæ E.	104 36 28	2830	103 3 5	2849	101 29 31	2834	99 55 47	2827
22	Sun W.	61 43 18	2556	63 23 13	2556	65 3 6	2559	66 42 57	2561
	Venus W.	24 17 23	2367	26 1 45	2367	27 46 7	2368	29 30 28	2369
	Antares E.	37 22 18	2948	35 35 2	2949	33 47 48	2951	32 0 37	2953
	α Aquilæ E.	92 5 34	2815	90 31 25	2816	88 57 18	2818	87 23 14	2821

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIb.	P. L. of Diff.	XXIb.	P. L. of Diff.
10	Fomalhaut W.	87° 34' 39"	3450	88° 55' 59"	3446	90° 17' 24"	3441	91° 38' 54"	3436
	Jupiter W.	77 42 5	3025	79 11 47	3091	80 41 34	3016	82 11 27	3010
	α Pegasi W.	65 58 24	3228	67 24 0	3220	68 49 46	3211	70 15 42	3202
	Saturn W.	42 47 1	3125	44 14 40	3116	45 42 30	3107	47 10 31	3098
	Pollux E.	53 27 36	3091	51 59 16	3089	50 30 53	3086	49 2 26	3082
	Sun E.	80 4 48	3416	78 42 50	3411	77 20 46	3406	75 58 36	3400
11	Jupiter W.	89 42 51	3273	91 13 35	3266	92 44 30	3258	94 15 36	3250
	α Pegasi W.	77 28 5	3156	78 55 7	3146	80 22 21	3136	81 49 47	3126
	Saturn W.	54 33 29	3049	56 2 41	3039	57 32 5	3028	59 1 43	3017
	α Arietis W.	34 9 22	3046	35 38 38	3034	37 8 8	3023	38 37 52	3012
	Mars W.	29 20 13	3355	30 43 21	3333	32 6 54	3313	33 30 51	3293
	Pollux E.	41 39 0	3089	40 10 4	3058	38 41 3	3054	37 11 57	3050
	Sun E.	69 5 55	3363	67 42 56	3354	66 19 47	3345	64 56 28	3336
12	Jupiter W.	101 53 59	3200	103 26 18	3209	104 58 51	3277	106 31 39	3266
	Saturn W.	66 33 18	2961	68 4 20	2948	69 35 38	2936	71 7 12	2923
	α Arietis W.	46 10 11	2951	47 41 25	2939	49 12 54	2927	50 44 39	2913
	Mars W.	40 36 0	3305	42 2 3	3188	43 28 27	3171	44 55 11	3155
	Pollux E.	29 45 27	3039	28 16 3	3040	26 46 40	3043	25 17 21	3050
	Sun E.	57 56 57	3269	56 32 25	3270	55 7 39	3258	53 42 38	3245
13	Saturn W.	78 49 3	2958	80 22 16	2944	81 55 47	2931	83 29 35	2917
	α Arietis W.	58 27 34	2947	60 1 1	2934	61 34 45	2920	63 8 47	2905
	Mars W.	52 13 43	3073	53 42 25	3057	55 11 27	3041	56 40 49	3025
	Aldebaran W.	27 7 33	3101	28 35 42	3061	30 4 39	3056	31 34 20	3053
	Sun E.	46 33 50	3181	45 7 18	3167	43 40 29	3153	42 13 23	3136
14	Saturn W.	91 23 6	2747	92 58 43	2733	94 34 39	2719	96 10 54	2705
	α Arietis W.	71 3 37	2735	72 39 31	2720	74 15 44	2706	75 52 16	2691
	Mars W.	64 12 41	2944	65 44 4	2928	67 15 48	2912	68 47 52	2896
	Aldebaran W.	39 12 10	2958	40 45 23	2935	42 19 5	2913	43 53 16	2799
	Sun E.	34 53 38	3089	33 24 50	3054	31 55 44	3040	30 26 21	3026
15	α Arietis W.	83 59 48	2920	85 38 16	2906	87 17 3	2892	88 56 9	2879
	Mars W.	76 33 16	2918	78 7 21	2902	79 41 46	2787	81 16 31	2773
	Aldebaran W.	51 50 53	2995	53 27 20	2978	55 4 49	2960	56 42 23	2943
	Sun E.	22 55 19	2964	21 24 21	2954	19 53 10	2945	18 21 48	2936
19	Sun W.	28 28 54	2599	30 7 50	2593	31 46 55	2587	33 26 8	2581
	Antares E.	73 5 39	2977	71 19 6	2972	69 32 25	2967	67 45 37	2963
20	Sun W.	41 43 53	2561	43 23 41	2559	45 3 32	2557	46 43 26	2555
	Antares E.	58 50 23	2949	57 3 9	2947	55 15 52	2946	53 28 33	2945
21	Sun W.	55 3 22	2553	56 43 22	2553	58 23 22	2553	60 3 21	2555
	Antares E.	44 31 41	2943	42 44 18	2944	40 56 56	2945	39 9 36	2947
	α Aquilæ E.	98 21 54	2921	96 47 54	2918	95 13 50	2916	93 39 43	2915
22	Sun W.	68 22 45	2564	70 2 30	2566	71 42 11	2569	73 21 48	2571
	Venus W.	31 14 48	2370	32 59 6	2371	34 43 22	2373	36 27 36	2375
	Antares E.	30 13 29	2954	28 26 25	2959	26 39 25	2962	24 52 29	2965
	α Aquilæ E.	85 49 14	2997	84 15 21	2933	82 41 36	2940	81 8 0	2948

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	Sun W.	75 1 21	2576	76 40 49	2579	78 20 13	2583	79 59 35	2586
	Venus W.	38 11 47	2377	39 55 55	2379	41 40 0	2381	43 24 2	2383
	Spica W.	22 52 57	2806	24 38 48	2304	26 24 42	2803	28 10 37	2303
	α Aquilæ E.	79 34 35	2858	78 1 22	2859	76 28 24	2858	74 55 42	2856
24	Sun W.	88 14 44	2607	89 53 29	2612	91 32 7	2618	93 10 38	2622
	Venus W.	52 3 17	2398	53 46 55	2401	55 30 29	2404	57 13 58	2408
	Spica W.	36 59 51	2313	38 45 32	2315	40 31 9	2318	42 16 42	2322
	α Aquilæ E.	67 17 13	2869	65 46 46	2812	64 16 48	2838	62 47 22	2868
	Jupiter E.	99 22 25	2273	97 35 44	2277	95 40 10	2281	94 2 42	2285
25	Sun W.	101 21 31	2849	102 59 19	2855	104 36 59	2860	106 14 32	2866
	Venus W.	65 50 7	2496	67 33 4	2430	69 15 56	2434	70 58 42	2438
	Spica W.	51 3 0	2343	52 47 57	2348	54 32 47	2353	56 17 30	2357
	α Aquilæ E.	55 29 54	2349	54 4 43	2397	52 40 28	2348	51 17 12	2404
	Fomalhaut E.	78 26 21	2754	76 50 53	2768	75 15 40	2779	73 40 44	2792
	Jupiter E.	85 12 4	2369	83 26 18	2314	81 40 39	2319	79 55 8	2324
	α Pegasi E.	99 12 8	2487	97 30 37	2490	95 49 10	2494	94 7 49	2499
26	Sun W.	114 20 14	2896	115 56 57	2705	117 33 31	2719	119 9 55	2719
	Venus W.	79 31 0	2460	81 13 9	2465	82 55 11	2471	84 37 5	2478
	Spica W.	64 59 15	2384	66 43 13	2390	68 27 2	2396	70 10 43	2401
	Antares W.	19 12 20	2380	20 56 23	2385	22 40 19	2391	24 24 7	2396
	Fomalhaut E.	65 50 50	2875	64 17 59	2895	62 45 34	2917	61 13 37	2942
	Jupiter E.	71 9 34	2354	69 24 53	2300	67 40 21	2306	65 55 58	2373
	α Pegasi E.	85 42 53	2598	84 2 19	2535	82 21 55	2543	80 41 41	2550
27	Sun W.	127 9 36	2755	128 45 3	2763	130 20 19	2771	131 55 25	2779
	Venus W.	93 4 52	2502	94 46 3	2507	96 27 7	2519	98 8 3	2517
	Spica W.	78 46 59	2433	80 29 47	2439	82 12 26	2445	83 54 56	2453
	Antares W.	33 1 0	2487	34 43 56	2434	36 26 42	2441	38 9 19	2447
	Fomalhaut E.	53 42 16	2863	52 13 58	2132	50 46 27	2173	49 19 46	2219
	Jupiter E.	57 16 29	2468	55 33 5	2415	53 49 52	2494	52 6 51	2432
	α Pegasi E.	72 23 18	2594	70 44 15	2604	69 5 26	2615	67 26 52	2626
28	Antares W.	46 39 57	2483	48 21 34	2491	50 3 0	2498	51 44 16	2506
	Jupiter E.	43 34 44	2476	41 52 57	2486	40 11 24	2496	38 30 5	2507
	α Pegasi E.	59 18 8	2692	57 41 18	2708	56 4 49	2725	54 28 43	2744
	Saturn E.	80 24 51	2507	78 43 48	2516	77 2 57	2524	75 22 17	2532
29	Antares W.	60 7 49	2547	61 47 57	2556	63 27 53	2564	65 7 37	2572
	Saturn E.	67 1 55	2577	65 22 29	2587	63 43 16	2597	62 4 17	2607
	α Arietis E.	87 48 47	2569	86 9 0	2571	84 29 25	2580	82 50 2	2589
30	Antares W.	73 23 16	2618	75 1 46	2628	76 40 3	2638	78 18 7	2648
	Saturn E.	53 52 59	2663	52 15 30	2675	50 38 17	2689	49 1 22	2708
	α Arietis E.	74 36 15	2655	72 58 8	2646	71 20 15	2655	69 42 35	2666
	Mars E.	88 57 17	2793	87 22 40	2809	85 48 15	2819	84 14 3	2828
31	Antares W.	86 25 6	2807	88 1 50	2707	89 38 20	2718	91 14 36	2728
	Saturn E.	41 1 19	2775	39 26 18	2799	37 51 40	2810	36 17 25	2829
	α Arietis E.	61 37 42	2718	60 1 26	2729	58 25 24	2740	56 49 37	2751
	Mars E.	76 26 17	2873	74 53 24	2883	73 20 44	2894	71 48 18	2906

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	Sun W.	81° 38' 46"	9590	83° 17' 54"	9595	84° 56' 56"	9599	86° 35' 53"	9603
	Venus W.	45 8 1	9395	46 51 56	9399	48 35 47	9391	50 19 34	9394
	Spica W.	29 56 32	9304	31 42 25	9305	33 28 17	9307	35 14 6	9310
	α Aquilæ E.	73 23 18	9911	71 51 13	9997	70 19 29	9946	68 48 8	9966
24	Sun W.	94 49 3	9697	96 27 21	9632	98 5 32	9638	99 43 35	9643
	Venus W.	58 57 22	9411	60 40 41	9415	62 23 55	9418	64 7 4	9422
	Spica W.	44 2 9	9396	45 47 31	9330	47 32 47	9334	49 17 57	9339
	α Aquilæ E.	61 18 31	9997	59 50 18	9130	58 22 45	9167	56° 55' 56"	9206
	Jupiter E.	92 16 21	9989	90 30 6	9994	88 43 58	9999	86 57 57	9304
25	Sun W.	107 51 57	9672	109 29 14	9679	111 6 22	9685	112 43 22	9691
	Venus W.	72 41 22	9443	74 23 56	9447	76 6 24	9458	77 48 45	9456
	Spica W.	58 2 6	9392	59 46 35	9368	61 30 56	9373	63 15 9	9378
	α Aquilæ E.	49 55 0	9466	48 33 58	9534	47 14 11	9606	45 55 45	9690
	Fomalhaut E.	72 6 6	9696	70 31 46	9691	68 57 45	9638	67 24 6	9655
	Jupiter E.	78 9 44	9330	76 24 28	9336	74 39 21	9349	72 54 23	9348
	α Pegasi E.	92 26 35	9504	90 45 28	9510	89 4 28	9515	87 23 36	9522
26	Sun W.	120 46 10	9795	122 22 16	9733	123 58 12	9740	125 33 59	9747
	Venus W.	86 18 52	9481	88 0 32	9485	89 42 6	9490	91 23 33	9496
	Spica W.	71 54 16	9408	73 37 40	9414	75 20 55	9420	77 4 1	9426
	Antares W.	26 7 47	9403	27 51 18	9408	29 34 41	9415	31 17 55	9421
	Fomalhaut E.	59 42 11	9697	58 11 17	9695	56 40 58	9696	55 11 17	9698
	Jupiter E.	64 11 45	9390	62 27 41	9387	60 43 47	9394	59 0 3	9401
	α Pegasi E.	79 1 37	9558	77 21 44	9566	75 42 3	9575	74 2 34	9585
27	Sun W.	133 30 20	9798	135 5 4	9796	136 39 37	9805	138 13 58	9814
	Venus W.	99 48 52	9523	101 29 33	9530	103 10 5	9535	104 50 29	9542
	Spica W.	85 37 16	9460	87 19 26	9467	89 1 26	9474	90 43 16	9480
	Antares W.	39 51 47	9454	41 34 5	9461	43 16 13	9469	44 58 10	9476
	Fomalhaut E.	47 53 59	9689	46 29 11	9694	45 5 27	9694	43 42 52	9691
	Jupiter E.	50 24 2	9440	48 41 25	9448	46 58 59	9457	45 16 45	9466
	α Pegasi E.	65 48 33	9539	64 10 31	9551	62 32 45	9564	60 55 17	9578
28	Antares W.	53 25 21	9514	55 6 15	9522	56 46 58	9530	58 27 29	9538
	Jupiter E.	36 49 1	9517	35 8 12	9530	33 27 40	9543	31 47 27	9558
	α Pegasi E.	52 53 1	9762	51 17 43	9769	49 42 51	9803	48 8 27	9896
	Saturn E.	73 41 48	9540	72 1 31	9549	70 21 26	9559	68 41 34	9568
29	Antares W.	66 47 10	9581	68 26 31	9591	70 5 39	9600	71 44 34	9610
	Saturn E.	60 25 32	9618	58 47 1	9629	57 8 45	9640	55 30 44	9652
	α Arietis E.	81 10 52	9598	79 31 54	9607	77 53 8	9616	76 14 35	9626
30	Antares W.	79 55 57	9657	81 33 34	9667	83 10 58	9677	84 48 9	9687
	Saturn E.	47 24 44	9715	45 48 24	9729	44 12 23	9744	42 36 41	9759
	α Arietis E.	68 5 9	9675	66 27 56	9686	64 50 57	9696	63 14 12	9707
	Mars E.	82 40 4	9632	81 6 17	9643	79 32 43	9652	77 59 23	9663
31	Antares W.	92 50 39	9738	94 26 28	9749	96 2 3	9759	97 37 25	9769
	Saturn E.	34 43 35	9649	33 10 11	9671	31 37 15	9695	30 4 50	9721
	α Arietis E.	55 14 5	9763	53 38 48	9774	52 3 46	9785	50 28 59	9797
	Mars E.	70 16 6	9916	68 44 8	9927	67 12 24	9939	65 40 54	9950

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
Mon.	1	<sup>h</sup> 10 <sup>m</sup> 41 <sup>s</sup> 4.50	9.070	N. 8° 20' 2.9"	-54.42	15 53.68	64.42	0 2.22	0.785
Tues.	2	10 44 42.03	9.058	7 58 13.6	54.74	15 53.91	64.38	0 21.20	0.797
Wed.	3	10 48 19.28	9.047	7 36 16.5	55.05	15 54.14	64.34	0 40.45	0.808
Thur.	4	10 51 56.27	9.037	7 14 11.8	55.35	15 54.37	64.30	0 59.95	0.818
Frid.	5	10 55 33.02	9.027	6 52 0.0	55.64	15 54.61	64.26	1 19.70	0.827
Sat.	6	10 59 9.55	9.019	6 29 41.3	55.92	15 54.85	64.22	1 39.68	0.835
Sun.	7	11 2 45.89	9.011	6 7 16.0	56.19	15 55.09	64.19	1 59.84	0.843
Mon.	8	11 6 22.05	9.004	5 44 44.6	56.44	15 55.33	64.16	2 20.17	0.850
Tues.	9	11 9 58.06	8.998	5 22 7.1	56.68	15 55.57	64.14	2 40.66	0.857
Wed.	10	11 13 33.93	8.993	4 59 24.2	56.90	15 55.81	64.12	3 1.29	0.862
Thur.	11	11 17 9.68	8.988	4 36 36.2	57.10	15 56.06	64.10	3 22.03	0.867
Frid.	12	11 20 45.33	8.984	4 13 43.3	57.30	15 56.31	64.08	3 42.87	0.871
Sat.	13	11 24 20.90	8.981	3 50 45.7	57.48	15 56.56	64.07	4 3.79	0.874
Sun.	14	11 27 56.39	8.978	3 27 44.0	57.65	15 56.81	64.06	4 24.80	0.877
Mon.	15	11 31 31.83	8.976	3 4 38.5	57.80	15 57.07	64.05	4 45.86	0.879
Tues.	16	11 35 7.22	8.975	2 41 29.4	57.93	15 57.33	64.05	5 6.96	0.880
Wed.	17	11 38 42.60	8.974	2 18 17.4	58.05	15 57.59	64.05	5 28.08	0.880
Thur.	18	11 42 17.96	8.975	1 55 2.7	58.16	15 57.86	64.05	5 49.20	0.880
Frid.	19	11 45 53.37	8.975	1 31 45.5	58.25	15 58.13	64.06	6 10.29	0.879
Sat.	20	11 49 28.78	8.977	1 8 26.2	58.33	15 58.40	64.07	6 31.37	0.877
Sun.	21	11 53 4.26	8.980	0 45 5.3	58.39	15 58.67	64.08	6 52.39	0.875
Mon.	22	11 56 39.81	8.983	N. 0 21 43.1	58.44	15 58.94	64.09	7 13.35	0.871
Tues.	23	12 0 15.44	8.987	S. 0 1 40.0	58.47	15 59.22	64.11	7 34.23	0.867
Wed.	24	12 3 51.16	8.992	0 25 3.9	58.49	15 59.50	64.13	7 54.99	0.862
Thur.	25	12 7 27.02	8.997	0 48 28.2	58.50	15 59.78	64.15	8 15.62	0.857
Frid.	26	12 11 3.03	9.004	1 11 52.3	58.49	16 0.06	64.17	8 36.12	0.850
Sat.	27	12 14 39.20	9.013	1 35 16.1	58.47	16 0.33	64.20	8 56.44	0.843
Sun.	28	12 18 15.57	9.020	1 58 39.1	58.44	16 0.61	64.23	9 16.57	0.834
Mon.	29	12 21 52.16	9.029	2 22 1.3	58.39	16 0.89	64.27	9 36.47	0.825
Tues.	30	12 25 29.00	9.040	2 45 22.1	58.33	16 1.17	64.31	9 56.14	0.814
Wed.	31	12 29 6.09	9.051	S. 3 8 41.2	-58.25	16 1.44	64.35	10 15.55	0.803

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.

— prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Mon.	1	10 41 4.51	9.072	N. 8 20 2.9	54.43	0 2.22	0.785	10 41 6.73
Tues.	2	10 44 42.09	9.060	7 58 13.3	54.75	0 21.21	0.797	10 45 3.29
Wed.	3	10 48 19.39	9.049	7 36 15.8	55.06	0 40.45	0.808	10 48 59.84
Thur.	4	10 51 56.43	9.039	7 14 10.8	55.36	0 59.97	0.818	10 52 56.40
Frid.	5	10 55 33.23	9.029	6 51 58.7	55.65	1 19.72	0.827	10 56 52.95
Sat.	6	10 59 9.81	9.021	6 29 39.7	55.93	1 39.70	0.835	11 0 49.51
Sun.	7	11 2 46.20	9.013	6 7 14.1	56.20	1 59.85	0.843	11 4 46.05
Mon.	8	11 6 22.41	9.006	5 44 42.3	56.45	2 20.20	0.850	11 8 42.61
Tues.	9	11 9 58.47	9.000	5 22 4.5	56.69	2 40.69	0.857	11 12 39.16
Wed.	10	11 13 34.39	8.995	4 59 21.3	56.91	3 1.33	0.862	11 16 35.72
Thur.	11	11 17 10.19	8.990	4 36 32.9	57.12	3 22.07	0.867	11 20 32.26
Frid.	12	11 20 45.89	8.986	4 13 39.7	57.32	3 42.93	0.871	11 24 28.82
Sat.	13	11 24 21.51	8.983	3 50 41.8	57.50	4 3.86	0.874	11 28 25.37
Sun.	14	11 27 57.06	8.980	3 27 39.7	57.67	4 24.87	0.877	11 32 21.93
Mon.	15	11 31 32.55	8.978	3 4 33.8	57.82	4 45.93	0.879	11 36 18.48
Tues.	16	11 35 8.00	8.977	2 41 24.4	57.95	5 7.04	0.880	11 40 15.04
Wed.	17	11 38 43.43	8.976	2 18 12.0	58.07	5 28.16	0.880	11 44 11.59
Thur.	18	11 42 18.86	8.975	1 54 56.9	58.18	5 49.29	0.880	11 48 8.15
Frid.	19	11 45 54.30	8.977	1 31 39.4	58.27	6 10.39	0.879	11 52 4.69
Sat.	20	11 49 29.77	8.979	1 8 19.8	58.35	6 31.48	0.877	11 56 1.25
Sun.	21	11 53 5.30	8.982	0 44 58.5	58.41	6 52.50	0.875	11 59 57.80
Mon.	22	11 56 40.90	8.985	N. 0 21 36.0	58.46	7 13.46	0.871	12 3 54.36
Tues.	23	12 0 16.58	8.989	S. 0 1 47.5	58.49	7 34.32	0.867	12 7 50.90
Wed.	24	12 3 52.36	8.994	0 25 11.7	58.51	7 55.10	0.862	12 11 47.46
Thur.	25	12 7 28.27	8.999	0 48 36.4	58.52	8 15.74	0.857	12 15 44.01
Frid.	26	12 11 4.33	9.006	1 12 0.8	58.51	8 36.24	0.850	12 19 40.57
Sat.	27	12 14 40.56	9.013	1 35 24.9	58.49	8 56.56	0.843	12 23 37.12
Sun.	28	12 18 16.98	9.022	1 58 48.2	58.46	9 16.70	0.834	12 27 33.68
Mon.	29	12 21 53.62	9.031	2 22 10.7	58.41	9 36.60	0.825	12 31 30.22
Tues.	30	12 25 30.51	9.042	2 45 31.8	58.35	9 56.27	0.814	12 35 26.78
Wed.	31	12 29 7.65	9.053	S. 3 8 51.3	58.27	10 15.68	0.803	12 39 23.32

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.  
 — prefixed to the hourly change of declination indicates that north declinations are decreasing;  
 south declinations increasing.

Diff. for 1 hour.  
 +9°.8566  
 (Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal $^{\circ}$ .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	244	158 <sup>o</sup> 39' 4.6"	38' 14.3"	145.21	+0.84	0.0037719	-43.6	<sup>h</sup> 13 <sup>m</sup> 16 <sup>s</sup> 42.39
2	245	159 37 10.6	36 20.2	145.28	0.91	.0036669	43.9	13 12 46.48
3	246	160 35 18.4	34 27.8	145.36	0.96	.0035613	44.1	13 8 50.57
4	247	161 33 28.1	32 37.4	145.44	0.95	.0034552	44.3	13 4 54.67
5	248	162 31 39.7	30 48.9	145.52	0.94	.0033486	44.5	13 0 58.76
6	249	163 29 53.3	29 2.4	145.60	0.89	.0032413	44.8	12 57 2.85
7	250	164 28 8.8	27 17.8	145.69	0.83	.0031332	45.2	12 53 6.94
8	251	165 26 26.4	25 35.3	145.78	0.73	.0030242	45.5	12 49 11.04
9	252	166 24 46.1	23 54.9	145.87	0.61	.0029144	45.9	12 45 15.13
10	253	167 23 8.0	22 16.7	145.95	0.48	.0028038	46.3	12 41 19.22
11	254	168 21 32.0	20 40.6	146.04	0.35	.0026921	46.8	12 37 23.31
12	255	169 19 57.9	19 6.4	146.12	0.22	.0025792	47.3	12 33 27.41
13	256	170 18 26.0	17 34.4	146.21	+0.09	.0024649	47.9	12 29 31.50
14	257	171 16 56.1	16 4.5	146.29	0.00	.0023493	48.4	12 25 35.59
15	258	172 15 28.3	14 36.5	146.38	-0.09	.0022323	49.0	12 21 39.68
16	259	173 14 2.3	13 10.4	146.45	0.15	.0021140	49.5	12 17 43.78
17	260	174 12 38.2	11 46.2	146.53	0.19	.0019944	50.1	12 13 47.87
18	261	175 11 16.0	10 23.9	146.61	0.18	.0018736	50.6	12 9 51.96
19	262	176 9 55.7	9 3.5	146.69	0.15	.0017517	51.0	12 5 56.05
20	263	177 8 37.1	7 44.8	146.76	0.10	.0016289	51.4	12 2 0.15
21	264	178 7 20.2	6 27.8	146.83	-0.03	.0015051	51.8	11 58 4.24
22	265	179 6 4.9	5 12.4	146.90	+0.09	.0013805	52.1	11 54 8.33
23	266	180 4 51.4	3 58.8	146.97	0.21	.0012553	52.3	11 50 12.42
24	267	181 3 39.6	2 46.9	147.04	0.35	.0011297	52.4	11 46 16.52
25	268	182 2 29.5	1 36.7	147.12	0.49	.0010039	52.5	11 42 20.61
26	269	183 1 21.2	0 28.3	147.20	0.63	.0008780	52.5	11 38 24.70
27	270	183 60 14.7	59 21.7	147.27	0.74	.0007522	52.4	11 34 28.79
28	271	184 59 10.0	58 16.9	147.35	0.84	.0006266	52.3	11 30 32.89
29	272	185 58 7.1	57 13.9	147.42	0.91	.0005011	52.2	11 26 36.98
30	273	186 57 6.1	56 12.8	147.50	0.96	.0003759	52.0	11 22 41.07
31	274	187 56 7.1	55 13.7	147.58	+0.98	0.0002512	-51.8	11 18 45.16
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>h</sup> .0.								Diff. for 1 hour. — 0 <sup>h</sup> .8906 (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
1	15' 14.7	15' 10.5	55' 50.2	-1.30	55' 34.8	-1.26	12 <sup>h</sup> 46.8 <sup>m</sup>	1.77	14.7 <sup>d</sup>
2	15' 6.5	15' 2.7	55' 20.0	1.20	55' 6.1	1.12	13 29.0	1.76	15.7
3	14' 59.2	14' 56.0	54' 53.2	1.02	54' 41.6	0.91	14 11.5	1.79	16.7
4	14' 53.3	14' 51.0	54' 31.5	0.77	54' 23.1	0.62	14 55.0	1.84	17.7
5	14' 49.3	14' 48.1	54' 16.7	0.44	54' 12.5	-0.26	15 40.2	1.92	18.7
6	14' 47.6	14' 47.7	54' 10.5	-0.07	54' 10.9	+0.13	16 27.3	2.01	19.7
7	14' 48.5	14' 49.9	54' 13.8	+0.34	54' 19.2	0.56	17 16.5	2.09	20.7
8	14' 52.1	14' 55.0	54' 27.3	0.77	54' 37.9	0.98	18 7.4	2.14	21.7
9	14' 58.6	15' 2.8	54' 51.0	1.19	55' 6.6	1.39	18 59.1	2.16	22.7
10	15' 7.7	15' 13.1	55' 24.4	1.57	55' 44.3	1.74	19 50.9	2.15	23.7
11	15' 19.0	15' 25.3	56' 6.0	1.87	56' 29.2	1.98	20 42.0	2.11	24.7
12	15' 32.0	15' 38.8	56' 53.6	2.06	57' 18.7	2.10	21 32.2	2.07	25.7
13	15' 45.7	15' 52.6	57' 44.0	2.10	58' 9.1	2.06	22 21.6	2.04	26.7
14	15' 59.1	16' 5.4	58' 33.3	1.97	58' 56.2	1.84	23 10.6	2.05	27.7
15	16' 11.1	16' 16.2	59' 17.3	1.66	59' 35.9	1.43	6		28.7
16	16' 20.4	16' 23.9	59' 51.6	1.18	60' 4.2	0.90	0 0.2	2.09	0.3
17	16' 26.3	16' 27.9	60' 13.2	0.61	60' 18.7	+0.31	0 51.4	2.18	1.3
18	16' 28.4	16' 28.0	60' 20.7	+0.02	60' 19.3	-0.26	1 45.1	2.30	2.3
19	16' 26.7	16' 24.6	60' 14.6	-0.52	60' 6.9	0.75	2 41.8	2.43	3.3
20	16' 21.8	16' 18.4	59' 56.6	0.95	59' 44.1	1.12	3 41.3	2.53	4.3
21	16' 14.5	16' 10.3	59' 29.8	1.25	59' 14.5	1.35	4 42.6	2.56	5.3
22	16' 5.7	16' 1.0	58' 57.4	1.42	58' 40.1	1.46	5 43.6	2.50	6.3
23	15' 56.2	15' 51.4	58' 22.5	1.47	58' 4.8	1.47	6 42.4	2.37	7.3
24	15' 46.6	15' 41.8	57' 47.2	1.46	57' 29.8	1.44	7 37.5	2.21	8.3
25	15' 37.2	15' 32.7	57' 12.8	1.40	56' 56.2	1.37	8 28.5	2.04	9.3
26	15' 28.3	15' 24.0	56' 40.0	1.33	56' 24.3	1.28	9 16.0	1.91	10.3
27	15' 19.9	15' 15.9	56' 9.2	1.24	55' 54.6	1.19	10 0.7	1.82	11.3
28	15' 12.1	15' 8.4	55' 40.5	1.14	55' 27.0	1.09	10 43.5	1.76	12.3
29	15' 4.9	15' 1.6	55' 14.2	1.03	55' 2.2	0.97	11 25.5	1.75	13.3
30	14' 58.6	14' 56.7	54' 50.9	0.91	54' 40.5	0.83	12 7.8	1.77	14.3
31	14' 53.2	14' 50.9	54' 31.0	0.74	54' 22.7	0.64	12 51.0	1.82	15.3
32	14' 49.0	14' 47.4	54' 15.6	-0.53	54' 9.9	-0.41	13 35.6	1.90	16.3



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 1.					WEDNESDAY 3.				
0	<sup>h</sup> 23 <sup>m</sup> 5 <sup>s</sup> 51.15	1.8999	S. 1° 21' 9.9"	13.843	0	<sup>h</sup> 0 36 <sup>m</sup> 1.51	1.8909	N. 9° 20' 13.4"	12.500
1	23 7 45.09	1.8981	1 7 19.5	13.837	1	0 37 54.35	1.8818	9 32 45.6	12.513
2	23 9 38.92	1.8963	0 53 29.4	13.831	2	0 39 47.25	1.8821	9 45 15.0	12.467
3	23 11 32.64	1.8945	0 39 39.8	13.823	3	0 41 40.20	1.8831	9 57 41.6	12.419
4	23 13 26.26	1.8929	0 25 50.7	13.813	4	0 43 33.22	1.8843	10 10 5.3	12.370
5	23 15 19.79	1.8913	S. 0 12 2.2	13.802	5	0 45 26.32	1.8856	10 22 26.0	12.320
6	23 17 13.22	1.8898	N. 0 1 45.6	13.791	6	0 47 19.49	1.8863	10 34 43.7	12.270
7	23 19 6.56	1.8883	0 15 32.7	13.779	7	0 49 12.73	1.8881	10 46 58.4	12.219
8	23 20 59.82	1.8869	0 29 19.1	13.767	8	0 51 6.06	1.8895	10 59 10.0	12.168
9	23 22 52.99	1.8856	0 43 4.8	13.754	9	0 52 59.47	1.8908	11 11 18.6	12.117
10	23 24 46.09	1.8843	0 56 49.6	13.739	10	0 54 52.96	1.8922	11 23 24.0	12.063
11	23 26 39.11	1.8831	1 10 33.5	13.733	11	0 56 46.54	1.8937	11 35 26.1	12.008
12	23 28 32.06	1.8819	1 24 16.4	13.707	12	0 58 40.21	1.8959	11 47 25.0	11.954
13	23 30 24.94	1.8808	1 37 58.3	13.690	13	1 0 33.97	1.8968	11 59 20.6	11.899
14	23 32 17.76	1.8796	1 51 39.2	13.673	14	1 2 27.83	1.8985	12 11 12.9	11.844
15	23 34 10.52	1.8789	2 5 18.9	13.652	15	1 4 21.79	1.9002	12 23 1.9	11.788
16	23 36 3.23	1.8780	2 18 57.4	13.632	16	1 6 15.85	1.9019	12 34 47.5	11.730
17	23 37 55.88	1.8771	2 32 34.8	13.612	17	1 8 10.02	1.9037	12 46 29.5	11.671
18	23 39 48.48	1.8763	2 46 10.9	13.590	18	1 10 4.30	1.9056	12 58 8.0	11.619
19	23 41 41.03	1.8756	2 59 45.6	13.567	19	1 11 58.69	1.9074	13 9 43.0	11.553
20	23 43 33.55	1.8750	3 13 19.0	13.544	20	1 13 53.19	1.9093	13 21 11.4	11.493
21	23 45 26.03	1.8743	3 26 50.9	13.520	21	1 15 47.80	1.9119	13 32 42.2	11.432
22	23 47 18.47	1.8737	3 40 21.4	13.496	22	1 17 42.53	1.9139	13 44 6.3	11.371
23	23 49 10.88	1.8733	N. 3 53 50.3	13.469	23	1 19 37.38	1.9153	N.13 55 26.7	11.308
TUESDAY 2.					THURSDAY 4.				
0	23 51 3.27	1.8730	N. 4 7 17.6	13.442	0	1 21 32.36	1.9174	N.14 6 43.3	11.945
1	23 52 55.64	1.8726	4 20 43.3	13.414	1	1 23 27.47	1.9195	14 17 56.1	11.889
2	23 54 47.98	1.8722	4 34 7.3	13.386	2	1 25 22.70	1.9216	14 29 5.1	11.817
3	23 56 40.30	1.8719	4 47 29.6	13.357	3	1 27 18.06	1.9238	14 40 10.2	11.752
4	23 58 32.61	1.8716	5 0 50.1	13.327	4	1 29 13.55	1.9260	14 51 11.4	11.687
5	0 0 24.92	1.8717	5 14 8.8	13.297	5	1 31 9.18	1.9283	15 2 8.6	11.620
6	0 2 17.22	1.8716	5 27 25.7	13.265	6	1 33 4.95	1.9307	15 13 1.8	11.553
7	0 4 9.51	1.8716	5 40 40.6	13.232	7	1 35 0.86	1.9330	15 23 51.0	11.485
8	0 6 1.81	1.8717	5 53 53.5	13.198	8	1 36 56.91	1.9353	15 34 36.0	11.416
9	0 7 54.11	1.8718	6 7 4.4	13.164	9	1 38 53.10	1.9377	15 45 16.9	11.347
10	0 9 46.42	1.8719	6 20 13.2	13.129	10	1 40 49.44	1.9402	15 55 53.6	11.277
11	0 11 38.74	1.8722	6 33 19.9	13.094	11	1 42 45.93	1.9428	16 6 26.1	11.207
12	0 13 31.08	1.8724	6 46 24.5	13.058	12	1 44 42.58	1.9454	16 16 54.4	11.136
13	0 15 23.43	1.8727	6 59 26.9	13.021	13	1 46 39.38	1.9479	16 27 18.4	11.063
14	0 17 15.81	1.8729	7 12 27.0	12.982	14	1 48 36.33	1.9505	16 37 38.0	10.990
15	0 19 8.21	1.8736	7 25 24.7	12.942	15	1 50 33.44	1.9532	16 47 53.2	10.917
16	0 21 0.64	1.8741	7 38 20.1	12.903	16	1 52 30.71	1.9558	16 58 4.0	10.842
17	0 22 53.10	1.8747	7 51 13.1	12.863	17	1 54 28.14	1.9586	17 8 10.3	10.767
18	0 24 45.60	1.8753	8 4 3.7	12.822	18	1 56 25.74	1.9613	17 18 12.1	10.692
19	0 26 38.14	1.8760	8 16 51.8	12.781	19	1 58 23.50	1.9641	17 28 9.4	10.617
20	0 28 30.72	1.8767	8 29 37.4	12.738	20	2 0 21.43	1.9668	17 38 2.1	10.542
21	0 30 23.24	1.8774	8 42 20.4	12.694	21	2 2 19.52	1.9696	17 47 50.1	10.467
22	0 32 16.01	1.8782	8 55 0.7	12.650	22	2 4 17.78	1.9725	17 57 33.4	10.392
23	0 34 8.73	1.8792	9 7 38.4	12.606	23	2 6 16.22	1.9755	18 7 12.1	10.317
24	0 36 1.51	1.8802	N. 9 20 13.4	12.560	24	2 8 14.84	1.9784	N.18 16 46.1	10.242

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 5.					SUNDAY 7.				
0	2 8 14.84	1.9784	N.18 16 46.1	9.527	0	3 46 51.75	2.1322	N.24 9 47.9	4.238
1	2 10 13.63	1.9813	18 26 15.3	9.446	1	3 48 59.78	2.1353	24 14 40.9	4.898
2	2 12 12.60	1.9842	18 35 39.6	9.364	2	3 51 7.99	2.1383	24 19 27.2	4.717
3	2 14 11.74	1.9872	18 44 59.0	9.282	3	3 53 16.38	2.1414	24 24 6.9	4.605
4	2 16 11.06	1.9902	18 54 13.5	9.200	4	3 55 24.96	2.1445	24 28 39.8	4.492
5	2 18 10.57	1.9933	19 3 23.0	9.118	5	3 57 33.72	2.1474	24 33 6.0	4.380
6	2 20 10.26	1.9963	19 12 27.6	9.034	6	3 59 42.65	2.1503	24 37 25.4	4.267
7	2 22 10.13	1.9994	19 21 27.1	8.949	7	4 1 51.76	2.1533	24 41 38.0	4.153
8	2 24 10.19	2.0025	19 30 21.5	8.865	8	4 4 1.05	2.1563	24 45 43.7	4.038
9	2 26 10.43	2.0056	19 39 10.9	8.780	9	4 6 10.52	2.1592	24 49 42.5	3.923
10	2 28 10.86	2.0087	19 47 55.1	8.693	10	4 8 20.16	2.1621	24 53 34.4	3.808
11	2 30 11.48	2.0119	19 56 34.1	8.606	11	4 10 29.97	2.1649	24 57 19.4	3.692
12	2 32 12.29	2.0151	20 5 7.8	8.518	12	4 12 39.95	2.1677	25 0 57.4	3.575
13	2 34 13.29	2.0183	20 13 36.3	8.430	13	4 14 50.10	2.1705	25 4 28.4	3.457
14	2 36 14.48	2.0215	20 21 59.4	8.341	14	4 17 0.41	2.1733	25 7 52.3	3.340
15	2 38 15.87	2.0247	20 30 17.2	8.252	15	4 19 10.89	2.1760	25 11 9.2	3.222
16	2 40 17.45	2.0279	20 38 29.6	8.162	16	4 21 21.53	2.1786	25 14 19.0	3.104
17	2 42 19.22	2.0311	20 46 36.6	8.071	17	4 23 32.32	2.1812	25 17 21.7	2.985
18	2 44 21.18	2.0343	20 54 38.1	7.979	18	4 25 43.27	2.1837	25 20 17.2	2.865
19	2 46 23.34	2.0376	21 2 34.1	7.887	19	4 27 54.37	2.1863	25 23 5.5	2.745
20	2 48 25.70	2.0409	21 10 24.5	7.794	20	4 30 5.63	2.1889	25 25 46.6	2.625
21	2 50 28.25	2.0442	21 18 9.4	7.702	21	4 32 17.04	2.1914	25 28 20.5	2.504
22	2 52 31.00	2.0475	21 25 48.7	7.608	22	4 34 28.60	2.1938	25 30 47.1	2.383
23	2 54 33.95	2.0507	N.21 33 22.3	7.512	23	4 36 40.30	2.1962	N.25 33 6.4	2.262
SATURDAY 6.					MONDAY 8.				
0	2 56 37.09	2.0540	N.21 40 50.1	7.416	0	4 38 52.14	2.1985	N.25 35 18.5	2.140
1	2 58 40.43	2.0573	21 48 12.2	7.320	1	4 41 4.12	2.2008	25 37 23.2	2.017
2	3 0 43.97	2.0607	21 55 28.5	7.223	2	4 43 16.24	2.2031	25 39 20.5	1.893
3	3 2 47.71	2.0640	22 2 39.0	7.126	3	4 45 28.49	2.2053	25 41 10.4	1.770
4	3 4 51.65	2.0673	22 9 43.7	7.028	4	4 47 40.88	2.2075	25 42 52.9	1.647
5	3 6 55.79	2.0706	22 16 42.4	6.929	5	4 49 53.59	2.2096	25 44 28.0	1.523
6	3 9 0.12	2.0739	22 23 35.2	6.830	6	4 52 6.03	2.2117	25 45 55.7	1.399
7	3 11 4.66	2.0772	22 30 22.0	6.730	7	4 54 18.79	2.2137	25 47 15.9	1.274
8	3 13 9.39	2.0805	22 37 2.8	6.630	8	4 56 31.67	2.2157	25 48 28.6	1.148
9	3 15 14.32	2.0838	22 43 37.6	6.529	9	4 58 44.68	2.2177	25 49 33.7	1.022
10	3 17 19.45	2.0872	22 50 6.3	6.427	10	5 0 57.80	2.2195	25 50 31.3	0.897
11	3 19 24.78	2.0904	22 56 28.8	6.324	11	5 3 11.02	2.2213	25 51 21.3	0.771
12	3 21 30.30	2.0937	23 2 45.2	6.221	12	5 5 24.35	2.2231	25 52 3.8	0.645
13	3 23 36.02	2.0970	23 8 55.4	6.118	13	5 7 37.79	2.2248	25 52 38.7	0.518
14	3 25 41.94	2.1002	23 14 59.3	6.013	14	5 9 51.33	2.2265	25 53 6.0	0.391
15	3 27 48.05	2.1035	23 20 57.0	5.909	15	5 12 4.97	2.2281	25 53 25.6	0.263
16	3 29 54.36	2.1067	23 26 48.4	5.803	16	5 14 18.70	2.2297	25 53 37.6	0.136
17	3 32 0.86	2.1100	23 32 33.4	5.697	17	5 16 32.53	2.2313	25 53 41.9	+0.008
18	3 34 7.56	2.1132	23 38 12.0	5.590	18	5 18 46.45	2.2327	25 53 38.6	-0.119
19	3 36 14.45	2.1164	23 43 44.2	5.483	19	5 21 0.45	2.2340	25 53 27.6	0.248
20	3 38 21.53	2.1196	23 49 10.0	5.376	20	5 23 14.53	2.2354	25 53 8.8	0.377
21	3 40 28.80	2.1227	23 54 29.3	5.267	21	5 25 28.70	2.2368	25 52 42.3	0.506
22	3 42 36.26	2.1259	23 59 42.1	5.158	22	5 27 42.95	2.2381	25 52 8.1	0.635
23	3 44 43.91	2.1291	24 4 48.3	5.048	23	5 29 57.27	2.2392	25 51 26.1	0.764
24	3 46 51.75	2.1322	N.24 9 47.9	4.938	24	5 32 11.65	2.2403	N.25 50 36.4	0.893

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 9.					THURSDAY 11.				
0	5 32 11.65	2.9403	N.25 50 36.4	0.893	0	7 20 0.94	2.9234	N.22 37 52.2	7.095
1	5 34 26.10	2.2414	25 49 38.9	1.093	1	7 22 14.91	2.9292	22 30 42.8	7.219
2	5 36 40.62	2.9425	25 48 33.6	1.159	2	7 24 28.81	2.9310	22 23 25.9	7.343
3	5 38 55.20	2.9434	25 47 20.6	1.989	3	7 26 42.63	2.9297	22 16 1.6	7.467
4	5 41 9.83	2.9443	25 45 59.8	1.419	4	7 28 56.37	2.9284	22 8 29.9	7.589
5	5 43 24.51	2.9452	25 44 31.1	1.543	5	7 31 10.03	2.9271	22 0 50.9	7.711
6	5 45 39.25	2.9461	25 42 54.6	1.673	6	7 33 23.62	2.9257	21 53 4.6	7.839
7	5 47 54.04	2.9468	25 41 10.3	1.803	7	7 35 37.12	2.9243	21 45 11.0	7.954
8	5 50 8.86	2.9474	25 39 18.2	1.934	8	7 37 50.54	2.9230	21 37 10.1	8.075
9	5 52 23.72	2.9480	25 37 18.2	2.065	9	7 40 3.88	2.9216	21 29 2.0	8.195
10	5 54 38.62	2.9487	25 35 10.4	2.196	10	7 42 17.13	2.9203	21 20 46.7	8.315
11	5 56 53.56	2.9493	25 32 54.7	2.327	11	7 44 30.30	2.9187	21 12 24.2	8.434
12	5 59 8.53	2.9497	25 30 31.2	2.457	12	7 46 43.38	2.9179	21 3 54.6	8.553
13	6 1 23.52	2.9501	25 27 59.8	2.588	13	7 48 56.37	2.9157	20 55 17.9	8.671
14	6 3 38.54	2.9505	25 25 20.6	2.718	14	7 51 9.27	2.9142	20 46 34.1	8.788
15	6 5 53.58	2.9507	25 22 33.6	2.849	15	7 53 22.08	2.9127	20 37 43.3	8.905
16	6 8 8.63	2.9509	25 19 38.7	2.981	16	7 55 34.80	2.9112	20 28 45.5	9.022
17	6 10 23.69	2.9519	25 16 35.9	3.112	17	7 57 47.43	2.9097	20 19 40.7	9.138
18	6 12 38.77	2.9513	25 13 25.3	3.242	18	7 59 59.97	2.9082	20 10 28.9	9.254
19	6 14 53.85	2.9513	25 10 6.8	3.373	19	8 2 12.41	2.9066	20 1 10.2	9.368
20	6 17 8.93	2.9514	25 6 40.5	3.503	20	8 4 24.76	2.9051	19 51 44.7	9.481
21	6 19 24.02	2.9514	25 3 6.4	3.634	21	8 6 37.02	2.9035	19 42 12.5	9.594
22	6 21 39.10	2.9513	24 59 24.4	3.765	22	8 8 49.18	2.9019	19 32 33.5	9.707
23	6 23 54.18	2.9519	N.24 55 34.6	3.895	23	8 11 1.25	2.9004	N.19 22 47.7	9.819
WEDNESDAY 10.					FRIDAY 12.				
0	6 26 9.25	2.9511	N.24 51 37.0	4.025	0	8 13 13.23	2.1988	N.19 12 55.2	9.931
1	6 28 24.31	2.9508	24 47 31.6	4.156	1	8 15 25.11	2.1973	19 2 56.0	10.041
2	6 30 39.35	2.9505	24 43 18.3	4.287	2	8 17 36.89	2.1956	18 52 50.3	10.150
3	6 32 54.37	2.9502	24 38 57.2	4.417	3	8 19 48.58	2.1940	18 42 38.0	10.259
4	6 35 9.37	2.9498	24 34 28.3	4.547	4	8 22 0.17	2.1924	18 32 19.2	10.368
5	6 37 24.35	2.9495	24 29 51.6	4.676	5	8 24 11.67	2.1909	18 21 53.9	10.476
6	6 39 39.31	2.9490	24 25 7.2	4.805	6	8 26 23.08	2.1893	18 11 22.1	10.589
7	6 41 54.23	2.9484	24 20 15.0	4.935	7	8 28 34.39	2.1877	18 0 44.0	10.698
8	6 44 9.12	2.9479	24 15 15.0	5.064	8	8 30 45.61	2.1862	17 49 59.5	10.794
9	6 46 23.98	2.9473	24 10 7.8	5.193	9	8 32 56.73	2.1846	17 39 8.7	10.899
10	6 48 38.80	2.9467	24 4 51.9	5.322	10	8 35 7.76	2.1831	17 28 11.6	11.009
11	6 50 53.58	2.9460	23 59 28.7	5.451	11	8 37 18.70	2.1815	17 17 8.4	11.105
12	6 53 8.32	2.9452	23 53 57.8	5.579	12	8 39 29.54	2.1799	17 5 59.0	11.207
13	6 55 23.01	2.9444	23 48 19.2	5.707	13	8 41 40.29	2.1784	16 54 43.5	11.308
14	6 57 37.65	2.9437	23 42 32.9	5.835	14	8 43 50.95	2.1770	16 43 22.0	11.409
15	6 59 52.25	2.9428	23 36 39.0	5.969	15	8 46 1.53	2.1755	16 31 54.4	11.509
16	7 2 6.79	2.9418	23 30 37.5	6.099	16	8 48 12.02	2.1741	16 20 20.9	11.607
17	7 4 21.27	2.9409	23 24 28.3	6.217	17	8 50 22.42	2.1726	16 8 41.5	11.705
18	7 6 35.70	2.9400	23 18 11.5	6.343	18	8 52 32.72	2.1710	15 56 56.3	11.809
19	7 8 50.07	2.9390	23 11 47.1	6.469	19	8 54 42.94	2.1697	15 45 5.3	11.908
20	7 11 4.37	2.9378	23 5 15.2	6.595	20	8 56 53.08	2.1683	15 33 8.5	12.004
21	7 13 18.61	2.9368	22 58 35.7	6.721	21	8 59 3.14	2.1669	15 21 6.0	12.098
22	7 15 32.79	2.9357	22 51 48.7	6.846	22	9 1 13.11	2.1655	15 8 57.9	12.190
23	7 17 46.90	2.9346	22 44 54.2	6.971	23	9 3 23.01	2.1643	14 56 44.2	12.274
24	7 20 0.94	2.9334	N.22 37 52.2	7.095	24	9 5 32.83	2.1630	N.14 44 25.0	12.365

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 13.					MONDAY 15.				
0	9 5 32.83	2.1680	N. 14° 44' 25.0"	12.365	0	10 48 33.45	2.1470	N. 3° 26' 8.6"	15.487
1	9 7 42.57	2.1617	14 32 0.4	12.456	1	10 50 42.30	2.1480	3 10 42.0	15.458
2	9 9 52.23	2.1604	14 19 30.3	12.546	2	10 52 51.21	2.1489	2 55 13.6	15.488
3	9 12 1.82	2.1592	14 6 54.9	12.634	3	10 55 0.17	2.1499	2 39 43.4	15.517
4	9 14 11.34	2.1580	13 54 14.2	12.722	4	10 57 9.20	2.1511	2 24 11.5	15.545
5	9 16 20.78	2.1568	13 41 28.3	12.808	5	10 59 18.31	2.1524	2 8 38.0	15.571
6	9 18 30.15	2.1556	13 28 37.2	12.894	6	11 1 27.49	2.1536	1 53 3.0	15.596
7	9 20 39.45	2.1545	13 15 41.0	12.978	7	11 3 36.74	2.1549	1 37 26.6	15.617
8	9 22 48.69	2.1535	13 2 39.8	13.062	8	11 5 46.08	2.1563	1 21 48.9	15.639
9	9 24 57.87	2.1525	12 49 33.6	13.144	9	11 7 55.50	2.1577	1 6 9.9	15.659
10	9 27 6.99	2.1515	12 36 22.5	13.225	10	11 10 5.00	2.1592	0 50 29.8	15.677
11	9 29 16.05	2.1505	12 23 6.6	13.306	11	11 12 14.60	2.1607	0 34 48.7	15.693
12	9 31 25.05	2.1496	12 9 45.8	13.386	12	11 14 24.29	2.1623	0 19 6.7	15.708
13	9 33 34.00	2.1487	11 56 20.3	13.463	13	11 16 34.08	2.1641	N. 0 3 23.8	15.721
14	9 35 42.89	2.1478	11 42 50.2	13.540	14	11 18 43.98	2.1659	S. 0 12 19.8	15.733
15	9 37 51.73	2.1470	11 29 15.5	13.616	15	11 20 53.98	2.1677	0 26 4.1	15.743
16	9 40 0.53	2.1462	11 15 36.3	13.691	16	11 23 4.10	2.1696	0 43 49.0	15.758
17	9 42 9.28	2.1455	11 1 52.6	13.765	17	11 25 14.33	2.1715	0 59 34.3	15.768
18	9 44 17.99	2.1448	10 48 4.5	13.838	18	11 27 24.68	2.1735	1 15 20.0	15.764
19	9 46 26.66	2.1442	10 34 12.1	13.909	19	11 29 35.15	2.1756	1 31 6.0	15.767
20	9 48 35.29	2.1436	10 20 15.4	13.979	20	11 31 45.75	2.1777	1 46 52.1	15.769
21	9 50 43.89	2.1430	10 6 14.6	14.048	21	11 33 56.48	2.1799	2 2 38.3	15.770
22	9 52 52.45	2.1424	9 52 9.7	14.116	22	11 36 7.34	2.1822	2 18 24.5	15.768
23	9 55 0.98	2.1420	N. 9 38 0.7	14.182	23	11 38 18.34	2.1845	S. 2 34 10.5	15.765
SUNDAY 14.					TUESDAY 16.				
0	9 57 9.49	2.1416	N. 9 23 47.8	14.247	0	11 40 29.48	2.1868	S. 2 49 56.3	15.761
1	9 59 17.97	2.1412	9 9 31.0	14.312	1	11 42 40.76	2.1893	3 5 41.8	15.754
2	10 1 26.43	2.1406	8 55 10.4	14.375	2	11 44 52.20	2.1919	3 21 26.8	15.746
3	10 3 34.87	2.1406	8 40 46.0	14.437	3	11 47 3.79	2.1944	3 37 11.3	15.737
4	10 5 43.20	2.1404	8 26 18.0	14.497	4	11 49 15.53	2.1971	3 52 55.2	15.735
5	10 7 51.72	2.1402	8 11 46.4	14.557	5	11 51 27.44	2.1998	4 8 38.3	15.712
6	10 10 0.12	2.1400	7 57 11.2	14.615	6	11 53 39.51	2.2026	4 24 20.6	15.697
7	10 12 8.52	2.1400	7 42 32.6	14.671	7	11 55 51.75	2.2054	4 40 1.9	15.680
8	10 14 16.92	2.1399	7 27 50.7	14.726	8	11 58 4.16	2.2083	4 55 42.2	15.662
9	10 16 25.31	2.1399	7 13 5.5	14.780	9	12 0 16.75	2.2113	5 11 21.3	15.642
10	10 18 33.71	2.1400	6 58 17.1	14.832	10	12 2 29.52	2.2143	5 26 59.2	15.620
11	10 20 42.11	2.1401	6 43 25.6	14.884	11	12 4 42.47	2.2174	5 42 35.7	15.596
12	10 22 50.52	2.1403	6 28 31.0	14.935	12	12 6 55.61	2.2206	5 58 10.7	15.570
13	10 24 58.95	2.1406	6 13 33.4	14.983	13	12 9 8.94	2.2238	6 13 44.1	15.543
14	10 27 7.39	2.1408	5 58 33.0	15.030	14	12 11 22.46	2.2270	6 29 15.9	15.515
15	10 29 15.85	2.1412	5 43 29.8	15.076	15	12 13 36.18	2.2303	6 44 45.9	15.484
16	10 31 24.33	2.1416	5 28 23.9	15.121	16	12 15 50.10	2.2337	7 0 14.0	15.459
17	10 33 32.84	2.1421	5 13 15.3	15.164	17	12 18 4.23	2.2372	7 15 40.1	15.417
18	10 35 41.38	2.1427	4 58 4.2	15.205	18	12 20 18.56	2.2406	7 31 4.0	15.380
19	10 37 49.96	2.1432	4 42 50.7	15.246	19	12 22 33.10	2.2442	7 46 25.7	15.343
20	10 39 58.57	2.1438	4 27 34.7	15.286	20	12 24 47.86	2.2478	8 1 45.2	15.304
21	10 42 7.22	2.1446	4 12 16.4	15.323	21	12 27 2.84	2.2515	8 17 2.2	15.262
22	10 44 15.92	2.1453	3 56 55.9	15.359	22	12 29 18.04	2.2552	8 32 16.6	15.218
23	10 46 24.66	2.1461	3 41 33.3	15.394	23	12 31 33.47	2.2590	8 47 28.4	15.173
24	10 48 33.45	2.1470	N. 3 26 8.0	15.427	24	12 33 49.12	2.2628	S. 9 2 37.4	15.126

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 17.					FRIDAY 19.				
0	<sup>h</sup> 12 <sup>m</sup> 33 <sup>s</sup> 49.12	2.9698	S. 9° 2' 37.4"	15.196	0	<sup>h</sup> 14 <sup>m</sup> 27 <sup>s</sup> 33.93	2.4837	S. 19° 40' 5.2"	10.754
1	12 36 5.00	2.9667	9 17 43.5	15.077	1	14 30 3.09	2.4883	19 50 46.5	10.691
2	12 38 21.12	2.9707	9 32 46.7	15.097	2	14 32 32.52	2.4989	20 1 19.7	10.486
3	12 40 37.48	2.9747	9 47 46.8	14.975	3	14 35 2.23	2.4975	20 11 44.8	10.350
4	12 42 54.08	2.9787	10 2 43.7	14.921	4	14 37 32.22	2.5090	20 22 1.7	10.212
5	12 45 10.92	2.9827	10 17 37.3	14.864	5	14 40 2.47	2.5064	20 32 10.3	10.074
6	12 47 28.00	2.9868	10 32 27.4	14.806	6	14 42 32.99	2.5109	20 42 10.6	9.934
7	12 49 45.33	2.9910	10 47 14.0	14.747	7	14 45 3.78	2.5153	20 52 2.4	9.792
8	12 52 2.92	2.9952	11 1 57.0	14.686	8	14 47 34.83	2.5198	21 1 45.7	9.649
9	12 54 20.76	2.9995	11 16 36.3	14.622	9	14 50 6.13	2.5238	21 11 20.3	9.504
10	12 56 38.86	2.3038	11 31 11.7	14.557	10	14 52 37.69	2.5261	21 20 46.2	9.368
11	12 58 57.22	2.3069	11 45 43.1	14.489	11	14 55 9.50	2.5303	21 30 3.3	9.219
12	13 1 15.84	2.3196	12 0 10.4	14.490	12	14 57 41.57	2.5385	21 39 11.6	9.063
13	13 3 34.73	2.3170	12 14 33.5	14.349	13	15 0 13.88	2.5405	21 48 10.9	8.913
14	13 5 53.88	2.3214	12 28 52.3	14.377	14	15 2 46.43	2.5444	21 57 1.2	8.769
15	13 8 13.30	2.3259	12 43 6.8	14.303	15	15 5 19.21	2.5483	22 5 42.4	8.610
16	13 10 32.99	2.3305	12 57 16.7	14.197	16	15 7 52.23	2.5521	22 14 14.4	8.457
17	13 12 52.96	2.3351	13 11 22.0	14.049	17	15 10 25.47	2.5558	22 22 37.2	8.303
18	13 15 13.20	2.3397	13 25 22.6	13.969	18	15 12 58.93	2.5595	22 30 50.7	8.147
19	13 17 33.72	2.3443	13 39 18.3	13.887	19	15 15 32.61	2.5639	22 38 54.8	7.989
20	13 19 54.52	2.3490	13 53 9.0	13.803	20	15 18 6.51	2.5667	22 46 49.4	7.831
21	13 22 15.60	2.3537	14 6 54.7	13.718	21	15 20 40.61	2.5701	22 54 34.5	7.679
22	13 24 36.96	2.3583	14 20 35.2	13.631	22	15 23 14.92	2.5735	23 2 10.0	7.512
23	13 26 58.60	2.3631	S. 14° 34' 10.4"	13.542	23	15 25 49.43	2.5767	S. 23° 9' 35.9"	7.351
THURSDAY 18.					SATURDAY 20.				
0	13 29 20.53	2.3679	S. 14° 47' 40.3"	13.452	0	15 28 24.12	2.5798	S. 23° 16' 52.1"	7.188
1	13 31 42.75	2.3727	15 1 4.7	13.359	1	15 30 59.00	2.5838	23 23 58.5	7.035
2	13 34 5.25	2.3774	15 14 23.4	13.264	2	15 33 34.06	2.5888	23 30 55.1	6.881
3	13 36 28.04	2.3822	15 27 36.4	13.168	3	15 36 9.30	2.5937	23 37 41.8	6.726
4	13 38 51.12	2.3871	15 40 43.6	13.071	4	15 38 44.71	2.5915	23 44 18.6	6.530
5	13 41 14.49	2.3920	15 53 44.9	12.971	5	15 41 20.28	2.5941	23 50 45.4	6.364
6	13 43 38.16	2.3969	16 6 40.1	12.869	6	15 43 56.00	2.5967	23 57 2.3	6.197
7	13 46 2.12	2.4017	16 19 29.2	12.767	7	15 46 31.88	2.5993	24 3 9.1	6.026
8	13 48 26.37	2.4065	16 32 12.1	12.663	8	15 49 7.90	2.6014	24 9 5.7	5.859
9	13 50 50.90	2.4113	16 44 48.6	12.555	9	15 51 44.05	2.6036	24 14 52.2	5.690
10	13 53 15.73	2.4163	16 57 18.7	12.447	10	15 54 20.33	2.6057	24 20 28.5	5.519
11	13 55 40.86	2.4219	17 9 42.2	12.336	11	15 56 56.74	2.6077	24 25 54.5	5.347
12	13 58 6.28	2.4261	17 21 59.0	12.224	12	15 59 33.26	2.6096	24 31 10.2	5.176
13	14 0 31.99	2.4309	17 34 9.1	12.111	13	16 2 9.89	2.6113	24 36 15.6	5.004
14	14 2 57.99	2.4358	17 46 12.3	11.995	14	16 4 46.62	2.6130	24 41 10.7	4.839
15	14 5 24.29	2.4407	17 58 8.5	11.878	15	16 7 23.45	2.6145	24 45 55.4	4.668
16	14 7 50.88	2.4456	18 9 57.7	11.760	16	16 10 0.36	2.6158	24 50 29.6	4.494
17	14 10 17.76	2.4503	18 21 39.7	11.640	17	16 12 37.35	2.6171	24 54 53.4	4.310
18	14 12 44.92	2.4551	18 33 14.5	11.518	18	16 15 14.41	2.6182	24 59 6.8	4.136
19	14 15 12.37	2.4599	18 44 41.9	11.395	19	16 17 51.54	2.6192	25 3 9.7	3.960
20	14 17 40.11	2.4647	18 56 1.9	11.270	20	16 20 28.72	2.6201	25 7 2.0	3.784
21	14 20 8.14	2.4695	19 7 14.3	11.142	21	16 23 5.95	2.6208	25 10 43.8	3.606
22	14 22 36.45	2.4742	19 18 19.0	11.014	22	16 25 43.22	2.6214	25 14 15.0	3.433
23	14 25 5.05	2.4790	19 29 16.0	10.885	23	16 28 20.52	2.6219	25 17 35.7	3.257
24	14 27 33.93	2.4837	S. 19° 40' 5.2"	10.754	24	16 30 57.85	2.6223	S. 25° 20' 45.8"	3.080

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 21.					TUESDAY 23.				
0	16 30 57.85	2.6923	S. 25° 20' 45.8"	3.080	0	18 34 43.46	2.4885	S. 24° 29' 27.9"	4.987
1	16 33 35.20	2.6925	25 23 45.3	2.903	1	18 37 12.61	2.4831	24 24 24.2	5.136
2	16 36 12.55	2.6925	25 26 34.2	2.737	2	18 39 41.43	2.4777	24 19 11.6	5.283
3	16 38 49.90	2.6924	25 29 12.5	2.550	3	18 42 9.93	2.4723	24 13 50.2	5.429
4	16 41 27.24	2.6923	25 31 40.2	2.373	4	18 44 38.10	2.4667	24 8 20.1	5.574
5	16 44 4.57	2.6920	25 33 57.2	2.195	5	18 47 5.93	2.4609	24 2 41.3	5.717
6	16 46 41.88	2.6915	25 36 3.6	2.018	6	18 49 33.41	2.4552	23 56 54.0	5.859
7	16 49 19.15	2.6909	25 37 59.4	1.849	7	18 52 0.55	2.4495	23 50 58.2	6.000
8	16 51 56.38	2.6903	25 39 44.6	1.685	8	18 54 27.35	2.4437	23 44 54.0	6.140
9	16 54 33.57	2.6193	25 41 19.2	1.498	9	18 56 53.80	2.4378	23 38 41.4	6.278
10	16 57 10.70	2.6189	25 42 43.2	1.312	10	18 59 19.89	2.4319	23 32 20.6	6.415
11	16 59 47.76	2.6170	25 43 56.6	1.136	11	19 1 45.63	2.4260	23 25 51.6	6.551
12	17 2 24.74	2.6157	25 44 59.5	0.960	12	19 4 11.01	2.4200	23 19 14.5	6.686
13	17 5 1.64	2.6143	25 45 51.8	0.783	13	19 6 36.03	2.4140	23 12 29.3	6.819
14	17 7 38.46	2.6128	25 46 33.5	0.607	14	19 9 0.69	2.4079	23 5 36.2	6.950
15	17 10 15.18	2.6112	25 47 4.7	0.439	15	19 11 24.98	2.4017	22 58 35.3	7.080
16	17 12 51.80	2.6093	25 47 25.3	0.257	16	19 13 48.90	2.3956	22 51 26.6	7.210
17	17 15 28.30	2.6073	25 47 35.5	-0.089	17	19 16 12.45	2.3895	22 44 10.1	7.338
18	17 18 4.68	2.6053	25 47 35.2	+0.092	18	19 18 35.64	2.3833	22 36 46.0	7.465
19	17 20 40.93	2.6031	25 47 24.4	0.966	19	19 20 58.45	2.3770	22 29 14.3	7.590
20	17 23 17.05	2.6007	25 47 3.3	0.439	20	19 23 20.88	2.3707	22 21 35.2	7.713
21	17 25 53.02	2.5982	25 46 31.8	0.612	21	19 25 42.94	2.3645	22 13 48.7	7.836
22	17 28 28.83	2.5956	25 45 49.9	0.784	22	19 28 4.62	2.3582	22 5 54.9	7.957
23	17 31 4.49	2.5929	S. 25 44 57.7	0.955	23	19 30 25.93	2.3520	S. 21 57 53.8	8.077
MONDAY 22.					WEDNESDAY 24.				
0	17 33 39.98	2.5900	S. 25 43 55.3	1.126	0	19 32 46.86	2.3457	S. 21 49 45.6	8.196
1	17 36 15.29	2.5879	25 42 42.6	1.297	1	19 35 7.41	2.3393	21 41 30.3	8.319
2	17 38 50.42	2.5859	25 41 19.6	1.467	2	19 37 27.58	2.3329	21 33 8.1	8.437
3	17 41 25.36	2.5807	25 39 46.5	1.637	3	19 39 47.36	2.3265	21 24 39.0	8.549
4	17 44 0.10	2.5773	25 38 3.2	1.805	4	19 42 6.76	2.3202	21 16 3.1	8.655
5	17 46 34.64	2.5739	25 36 9.9	1.973	5	19 44 25.78	2.3138	21 7 20.4	8.767
6	17 49 8.97	2.5703	25 34 6.5	2.140	6	19 46 44.42	2.3075	20 58 31.1	8.877
7	17 51 43.08	2.5666	25 31 53.1	2.307	7	19 49 2.68	2.3011	20 49 35.2	8.985
8	17 54 16.96	2.5627	25 29 29.7	2.473	8	19 51 20.55	2.2947	20 40 32.9	9.092
9	17 56 50.61	2.5588	25 26 56.5	2.636	9	19 53 38.04	2.2883	20 31 24.2	9.196
10	17 59 24.02	2.5548	25 24 13.4	2.800	10	19 55 55.15	2.2820	20 22 9.1	9.303
11	18 1 57.19	2.5507	25 21 20.5	2.963	11	19 58 11.88	2.2757	20 12 47.8	9.406
12	18 4 30.11	2.5465	25 18 17.8	3.126	12	20 0 28.23	2.2693	20 3 20.4	9.507
13	18 7 2.77	2.5422	25 15 5.4	3.286	13	20 2 44.20	2.2630	19 53 46.9	9.608
14	18 9 35.17	2.5377	25 11 43.5	3.445	14	20 4 59.79	2.2567	19 44 7.4	9.707
15	18 12 7.29	2.5331	25 8 12.0	3.604	15	20 7 15.00	2.2503	19 34 22.1	9.804
16	18 14 39.14	2.5286	25 4 31.0	3.763	16	20 9 29.83	2.2441	19 24 31.0	9.900
17	18 17 10.72	2.5239	25 0 40.5	3.920	17	20 11 44.29	2.2379	19 14 34.1	9.996
18	18 19 42.01	2.5191	24 56 40.6	4.076	18	20 13 58.38	2.2317	19 4 31.5	10.089
19	18 22 13.01	2.5143	24 52 31.4	4.230	19	20 16 12.10	2.2255	18 54 23.4	10.181
20	18 24 43.71	2.5098	24 48 13.0	4.384	20	20 18 25.44	2.2193	18 44 9.8	10.273
21	18 27 14.11	2.5049	24 43 45.3	4.537	21	20 20 38.41	2.2131	18 33 50.8	10.361
22	18 29 44.21	2.4990	24 39 8.5	4.689	22	20 22 51.01	2.2070	18 23 26.5	10.449
23	18 32 13.99	2.4938	24 34 22.7	4.838	23	20 25 3.25	2.2008	18 12 56.9	10.536
24	18 34 43.46	2.4885	S. 24 29 27.9	4.987	24	20 27 15.12	2.1946	S. 18 2 22.2	10.621

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 25.					SATURDAY 27.				
0	20 27 15.12	2.1948	S. 18° 2' 22.2"	10.621	0	22 6 27.79	1.9698	S. 8° 18' 33.8"	13.940
1	20 29 26.63	2.1888	17 51 42.4	10.705	1	22 8 25.28	1.9664	8 5 18.6	13.967
2	20 31 37.78	2.1828	17 40 57.6	10.788	2	22 10 22.56	1.9630	7 52 1.8	13.992
3	20 33 48.57	2.1768	17 30 7.8	10.870	3	22 12 19.64	1.9497	7 38 43.5	13.317
4	20 35 59.00	2.1709	17 19 13.2	10.949	4	22 14 16.52	1.9464	7 25 23.8	13.340
5	20 38 9.08	2.1650	17 8 13.9	11.027	5	22 16 13.21	1.9433	7 12 2.7	13.363
6	20 40 18.80	2.1591	16 57 9.9	11.105	6	22 18 9.70	1.9400	6 58 40.4	13.383
7	20 42 28.17	2.1533	16 46 1.3	11.182	7	22 20 6.01	1.9370	6 45 16.8	13.403
8	20 44 37.20	2.1476	16 34 48.1	11.256	8	22 22 2.14	1.9340	6 31 52.0	13.422
9	20 46 45.88	2.1418	16 23 30.5	11.329	9	22 23 58.09	1.9310	6 18 26.2	13.439
10	20 48 54.22	2.1362	16 12 8.6	11.402	10	22 25 53.86	1.9282	6 4 59.3	13.456
11	20 51 2.22	2.1305	16 0 42.3	11.473	11	22 27 49.47	1.9254	5 51 31.4	13.473
12	20 53 9.88	2.1248	15 49 11.8	11.542	12	22 29 44.91	1.9226	5 38 2.5	13.488
13	20 55 17.20	2.1193	15 37 37.2	11.611	13	22 31 40.18	1.9199	5 24 32.8	13.503
14	20 57 24.20	2.1139	15 25 58.5	11.678	14	22 33 35.30	1.9173	5 11 2.2	13.516
15	20 59 30.87	2.1084	15 14 15.9	11.743	15	22 35 30.26	1.9147	4 57 30.9	13.528
16	21 1 37.21	2.1030	15 2 29.4	11.808	16	22 37 25.07	1.9122	4 43 58.9	13.539
17	21 3 43.23	2.0977	14 50 39.0	11.871	17	22 39 19.73	1.9097	4 30 26.2	13.549
18	21 5 48.93	2.0923	14 38 44.9	11.932	18	22 41 14.24	1.9073	4 16 53.0	13.558
19	21 7 54.31	2.0871	14 26 47.1	11.993	19	22 43 8.61	1.9051	4 3 19.2	13.566
20	21 9 59.38	2.0819	14 14 45.7	12.052	20	22 45 2.85	1.9029	3 49 45.0	13.573
21	21 12 4.14	2.0768	14 2 40.8	12.111	21	22 46 56.96	1.9008	3 36 10.4	13.580
22	21 14 8.59	2.0717	13 50 32.4	12.168	22	22 48 50.94	1.8987	3 22 35.4	13.586
23	21 16 12.74	2.0666	S. 13 38 20.6	12.224	23	22 50 44.80	1.8966	S. 3 9 0.1	13.590
FRIDAY 26.					SUNDAY 28.				
0	21 18 16.58	2.0616	S. 13 26 5.5	12.278	0	22 52 38.53	1.8945	S. 2 55 24.6	13.593
1	21 20 20.13	2.0567	13 13 47.2	12.332	1	22 54 32.14	1.8926	2 41 48.9	13.596
2	21 22 23.39	2.0518	13 1 25.7	12.384	2	22 56 25.64	1.8908	2 28 13.1	13.597
3	21 24 26.35	2.0469	12 49 1.1	12.435	3	22 58 19.04	1.8891	2 14 37.2	13.598
4	21 26 29.02	2.0422	12 36 33.5	12.484	4	23 0 12.33	1.8873	2 1 1.3	13.598
5	21 28 31.41	2.0376	12 24 3.0	12.532	5	23 2 5.51	1.8857	1 47 25.4	13.597
6	21 30 33.53	2.0330	12 11 29.6	12.580	6	23 3 58.61	1.8840	1 33 49.7	13.594
7	21 32 35.37	2.0283	11 58 53.4	12.627	7	23 5 51.60	1.8825	1 20 14.1	13.589
8	21 34 36.93	2.0237	11 46 14.4	12.673	8	23 7 44.52	1.8811	1 6 38.7	13.588
9	21 36 38.22	2.0192	11 33 32.8	12.716	9	23 9 37.33	1.8797	0 53 3.5	13.583
10	21 38 39.24	2.0149	11 20 48.5	12.759	10	23 11 30.07	1.8783	0 39 28.7	13.578
11	21 40 40.01	2.0106	11 8 1.7	12.800	11	23 13 22.73	1.8770	0 25 54.2	13.573
12	21 42 40.52	2.0063	10 55 12.5	12.840	12	23 15 15.31	1.8756	S. 0 12 20.1	13.564
13	21 44 40.77	2.0021	10 42 20.9	12.880	13	23 17 7.82	1.8746	N. 0 1 13.5	13.556
14	21 46 40.77	1.9980	10 29 26.9	12.918	14	23 19 0.26	1.8736	0 14 46.6	13.546
15	21 48 40.53	1.9939	10 16 30.7	12.955	15	23 20 52.64	1.8726	0 28 19.0	13.535
16	21 50 40.04	1.9898	10 3 32.3	12.992	16	23 22 44.96	1.8715	0 41 50.8	13.525
17	21 52 39.31	1.9858	9 50 31.7	13.027	17	23 24 37.22	1.8705	0 55 22.0	13.513
18	21 54 38.34	1.9819	9 37 29.1	13.060	18	23 26 29.42	1.8697	1 8 52.4	13.500
19	21 56 37.14	1.9781	9 24 24.5	13.092	19	23 28 21.58	1.8689	1 22 22.0	13.487
20	21 58 35.71	1.9743	9 11 18.0	13.124	20	23 30 13.69	1.8682	1 35 50.8	13.473
21	22 0 34.06	1.9707	8 58 9.6	13.155	21	23 32 5.76	1.8675	1 49 18.7	13.457
22	22 2 32.19	1.9670	8 44 59.4	13.185	22	23 33 57.79	1.8668	2 2 45.7	13.441
23	22 4 30.10	1.9633	8 31 47.4	13.213	23	23 35 49.78	1.8662	2 16 11.6	13.424
24	22 6 27.79	1.9598	S. 8 18 33.8	13.240	24	23 37 41.74	1.8657	N. 2 29 36.5	13.406

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 29.					TUESDAY 30.				
0	<sup>h</sup> 23 <sup>m</sup> 37 <sup>s</sup> 41.74	1.8657	N. 2° 29' 36.5"	13.406	0	<sup>h</sup> 0 <sup>m</sup> 22 <sup>s</sup> 28.22	1.8707	N. 7° 44' 9.2"	12.737
1	23 39 33.67	1.8653	2 43 0.3	13.387	1	0 24 20.49	1.8717	7 56 51.7	12.689
2	23 41 25.58	1.8650	2 56 22.9	13.367	2	0 26 12.82	1.8726	8 9 31.9	12.650
3	23 43 17.47	1.8647	3 9 44.4	13.347	3	0 28 5.20	1.8735	8 22 9.7	12.610
4	23 45 9.34	1.8644	3 23 4.6	13.326	4	0 29 57.64	1.8746	8 34 45.1	12.569
5	23 47 1.20	1.8642	3 36 23.5	13.303	5	0 31 50.15	1.8757	8 47 18.0	12.527
6	23 48 53.04	1.8640	3 49 41.0	13.280	6	0 33 42.72	1.8768	8 59 48.3	12.484
7	23 50 44.88	1.8639	4 2 57.1	13.257	7	0 35 35.36	1.8779	9 12 16.1	12.442
8	23 52 36.71	1.8638	4 16 11.8	13.232	8	0 37 28.07	1.8790	9 24 41.3	12.398
9	23 54 28.54	1.8639	4 29 25.0	13.207	9	0 39 20.86	1.8804	9 37 3.8	12.353
10	23 56 20.38	1.8640	4 42 36.7	13.181	10	0 41 13.72	1.8817	9 49 23.6	12.308
11	23 58 12.22	1.8641	4 55 46.7	13.154	11	0 43 6.67	1.8831	10 1 40.7	12.262
12	0 0 4.07	1.8643	5 8 55.1	13.126	12	0 44 59.70	1.8845	10 13 55.0	12.214
13	0 1 55.93	1.8645	5 22 1.8	13.097	13	0 46 52.81	1.8860	10 26 6.4	12.166
14	0 3 47.81	1.8648	5 35 6.7	13.067	14	0 48 46.02	1.8876	10 38 14.9	12.117
15	0 5 39.71	1.8652	5 48 9.9	13.037	15	0 50 39.32	1.8891	10 50 20.5	12.068
16	0 7 31.63	1.8656	6 1 11.2	13.006	16	0 52 32.71	1.8907	11 2 23.1	12.018
17	0 9 23.58	1.8661	6 14 10.6	12.973	17	0 54 26.20	1.8922	11 14 22.7	11.967
18	0 11 15.56	1.8666	6 27 8.0	12.940	18	0 56 19.78	1.8939	11 26 19.2	11.916
19	0 13 7.57	1.8672	6 40 3.4	12.907	19	0 58 13.47	1.8957	11 38 12.6	11.863
20	0 14 59.62	1.8677	6 52 56.8	12.873	20	1 0 7.26	1.8974	11 50 2.8	11.809
21	0 16 51.70	1.8684	7 5 48.2	12.838	21	1 2 1.16	1.8992	12 1 49.7	11.755
22	0 18 43.83	1.8692	7 18 37.4	12.802	22	1 3 55.17	1.9011	12 13 33.4	11.701
23	0 20 36.00	1.8699	7 31 24.4	12.765	23	1 5 49.29	1.9030	12 25 13.8	11.645
24	0 22 28.22	1.8707	N. 7° 44' 9.2"	12.727	24	1 7 43.53	1.9049	N. 12° 36' 50.8"	11.589

PHASES OF THE MOON.

☾ Last Quarter, . . . . .	<sup>d</sup> 8	<sup>h</sup> 8	<sup>m</sup> 4.0
● New Moon, . . . . .	15	17	56.7
☽ First Quarter, . . . . .	22	9	19.7
○ Full Moon, . . . . .	29	21	16.9

☾ Apogee, . . . . .	<sup>d</sup> 6	<sup>h</sup> 4.5
☾ Perigee, . . . . .	18	1.0



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Aquilæ W.	51° 1' 41"	3785	52° 16' 48"	3763	53° 32' 29"	3734	54° 48' 40"	3709
	$\alpha$ Arietis E.	48 54 27	2808	47 20 10	2821	45 46 9	2833	44 12 24	2845
	Mars E.	64 9 38	2961	62 38 36	2973	61 7 49	2984	59 37 16	2996
	Aldebaran E.	81 33 11	2836	79 59 30	2848	78 26 4	2859	76 52 52	2869
2	$\alpha$ Aquilæ W.	61 15 21	3622	62 33 32	3610	63 51 55	3600	65 10 29	3592
	Fomalhaut W.	37 15 11	4153	38 24 22	4076	39 34 47	4010	40 46 17	3950
	Jupiter W.	22 54 49	2919	24 26 44	2917	25 58 41	2917	27 30 38	2918
	$\alpha$ Arietis E.	36 27 41	2910	34 55 35	2924	33 23 47	2939	31 52 17	2953
	Mars E.	52 8 12	3055	50 39 7	3067	49 10 17	3080	47 41 43	3092
	Aldebaran E.	69 10 28	2926	67 38 42	2938	66 7 11	2950	64 35 55	2961
3	$\alpha$ Aquilæ W.	71 45 2	3571	73 4 8	3569	74 23 16	3568	75 42 25	3569
	Fomalhaut W.	46 56 36	3743	48 12 38	3714	49 29 10	3689	50 46 9	3666
	Jupiter W.	35 9 31	2939	36 41 0	2945	38 12 22	2950	39 43 37	2957
	Mars E.	40 22 41	3157	38 55 40	3170	37 28 55	3184	36 2 27	3198
	Aldebaran E.	57 3 11	3019	55 33 22	3030	54 3 47	3043	52 34 27	3055
	Pollux E.	98 54 47	2967	97 23 53	2975	95 53 9	2984	94 22 36	2993
4	$\alpha$ Aquilæ W.	82 17 51	3578	83 36 49	3569	84 55 43	3567	86 14 32	3561
	Fomalhaut W.	57 16 20	3585	58 35 11	3574	59 54 14	3564	61 13 28	3554
	Jupiter W.	47 18 1	2985	48 48 32	2991	50 18 56	2998	51 49 14	3001
	$\alpha$ Pegasi W.	34 32 23	3495	35 52 53	3468	37 13 53	3444	38 35 20	3423
	Mars E.	28 54 44	3264	27 30 14	3306	26 6 9	3338	24 42 30	3354
	Aldebaran E.	45 11 33	3117	43 43 44	3130	42 16 11	3144	40 48 55	3159
	Pollux E.	86 52 24	3031	85 22 50	3038	83 53 24	3045	82 24 7	3052
5	Fomalhaut W.	67 51 52	3521	69 11 53	3515	70 32 0	3511	71 52 12	3507
	Jupiter W.	59 19 10	3023	60 48 54	3027	62 18 33	3030	63 48 8	3034
	$\alpha$ Pegasi W.	45 27 39	3351	46 50 52	3341	48 14 16	3339	49 37 51	3333
	Saturn W.	22 53 7	3269	24 17 31	3265	25 42 24	3244	27 7 41	3227
	Aldebaran E.	33 37 10	3249	32 11 51	3264	30 46 57	3268	29 22 29	3219
	Pollux E.	74 59 35	3090	73 31 1	3085	72 2 33	3089	70 34 10	3092
	Sun E.	126 14 29	3433	124 52 50	3438	123 31 16	3441	122 9 46	3446
6	Fomalhaut W.	78 34 12	3491	79 54 46	3468	81 15 24	3465	82 36 5	3463
	Jupiter W.	71 15 16	3043	72 44 36	3043	74 13 55	3044	75 43 13	3044
	$\alpha$ Pegasi W.	56 37 59	3289	58 2 23	3283	59 26 54	3277	60 51 32	3279
	Saturn W.	34 18 10	3173	35 44 51	3166	37 11 41	3159	38 38 39	3159
	Pollux E.	63 13 20	3108	61 45 20	3110	60 17 22	3119	58 49 27	3114
	Sun E.	115 23 10	3456	114 1 57	3457	112 40 45	3458	111 19 34	3458
7	Fomalhaut W.	89 20 12	3470	90 41 10	3468	92 2 10	3465	93 23 13	3463
	Jupiter W.	83 9 57	3037	84 39 24	3034	86 8 54	3031	87 38 28	3027
	$\alpha$ Pegasi W.	67 56 21	3243	69 21 39	3237	70 47 4	3231	72 12 37	3225
	Saturn W.	45 55 29	3121	47 23 13	3114	48 51 5	3108	50 19 5	3102
	$\alpha$ Arietis W.	24 23 37	3161	25 50 33	3148	27 17 44	3137	28 45 9	3126
	Pollux E.	51 30 8	3114	50 2 16	3114	48 34 24	3114	47 6 31	3119
	Sun E.	104 33 29	3451	103 12 10	3448	101 50 48	3444	100 29 21	3440
8	Jupiter W.	95 7 37	3003	96 37 46	2996	98 8 4	2999	99 38 30	2992
	$\alpha$ Pegasi W.	79 22 19	3169	80 48 41	3161	82 15 13	3173	83 41 54	3165
	Saturn W.	57 41 7	3065	59 9 59	3057	60 39 1	3049	62 8 13	3039

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	$\alpha$ Aquilæ W.	56 5 18	3686	57 22 20	3666	58 39 43	3642	59 57 24	3635
	$\alpha$ Arietis E.	42 38 55	3658	41 5 42	3670	39 32 45	3683	38 0 5	3696
	Mars E.	58 6 58	3008	56 36 55	3019	55 7 6	3031	53 37 32	3043
	Aldebaran E.	75 19 54	2981	73 47 11	2992	72 14 42	2904	70 42 28	2915
2	$\alpha$ Aquilæ W.	66 29 12	3566	67 48 2	3580	69 6 58	3576	70 25 58	3573
	Fomalhaut W.	41 58 46	3698	43 12 8	3652	44 26 17	3611	45 41 8	3775
	Jupiter W.	29 2 34	2991	30 34 26	2995	32 6 13	2999	33 37 55	2934
	$\alpha$ Arietis E.	30 21 5	2989	28 50 13	2985	27 19 42	3003	25 49 33	3022
	Mars E.	46 13 24	3105	44 45 20	3117	43 17 31	3130	41 49 58	3143
	Aldebaran E.	63 4 53	2973	61 34 6	2984	60 3 33	2996	58 33 15	3007
3	$\alpha$ Aquilæ W.	77 1 33	3570	78 20 40	3571	79 39 46	3573	80 58 50	3576
	Fomalhaut W.	52 3 32	3646	53 21 17	3698	54 39 21	3611	55 57 43	3598
	Jupiter W.	41 14 44	2989	42 45 44	2968	44 16 37	2973	45 47 23	2980
	Mars E.	34 36 16	3214	33 10 24	3230	31 44 51	3247	30 19 37	3265
	Aldebaran E.	51 5 22	3067	49 36 32	3079	48 7 57	3091	46 39 37	3105
	Pollux E.	92 52 14	3001	91 22 2	3009	89 52 0	3016	88 22 7	3024
4	$\alpha$ Aquilæ W.	87 33 16	3596	88 51 55	3600	90 10 29	3605	91 28 58	3610
	Fomalhaut W.	62 32 53	3546	63 52 26	3538	65 12 8	3532	66 31 57	3596
	Jupiter W.	53 19 25	3006	54 49 30	3011	56 19 29	3016	57 49 22	3020
	$\alpha$ Pegasi W.	39 57 11	3404	41 19 23	3388	42 41 53	3374	44 4 39	3362
	Mars E.	23 19 21	3384	21 56 46	3418	20 34 50	3458	19 13 39	3506
	Aldebaran E.	39 21 57	3174	37 55 17	3189	36 28 55	3205	35 2 52	3223
5	Pollux E.	80 54 58	3058	79 25 57	3064	77 57 3	3069	76 28 16	3074
	Fomalhaut W.	73 12 28	3504	74 32 49	3500	75 53 13	3497	77 13 41	3494
	Jupiter W.	65 17 39	3036	66 47 7	3039	68 16 32	3040	69 45 55	3042
	$\alpha$ Pegasi W.	51 1 36	3315	52 25 30	3308	53 49 32	3301	55 13 42	3295
	Saturn W.	28 33 18	3214	29 59 11	3201	31 25 19	3191	32 51 39	3182
	Aldebaran E.	27 58 31	3340	26 35 6	3373	25 12 19	3411	23 50 15	3455
6	Pollux E.	69 5 51	3096	67 37 37	3100	66 9 27	3104	64 41 22	3106
	Sun E.	120 48 21	3448	119 26 59	3451	118 5 40	3454	116 44 24	3455
	Fomalhaut W.	83 56 49	3480	85 17 36	3478	86 38 25	3475	87 59 17	3472
	Jupiter W.	77 12 31	3043	78 41 50	3042	80 11 11	3041	81 40 33	3039
	$\alpha$ Pegasi W.	62 16 16	3266	63 41 7	3260	65 6 5	3254	66 31 10	3249
	Saturn W.	40 5 46	3145	41 33 1	3139	43 0 23	3133	44 27 52	3127
7	Pollux E.	57 21 34	3114	55 53 42	3114	54 25 50	3115	52 57 59	3115
	Sun E.	109 58 23	3458	108 37 12	3457	107 16 0	3455	105 54 46	3453
	Fomalhaut W.	94 44 18	3461	96 5 26	3458	97 26 37	3456	98 47 50	3454
	Jupiter W.	89 8 7	3023	90 37 51	3019	92 7 40	3014	93 37 35	3009
	$\alpha$ Pegasi W.	73 38 17	3218	75 4 5	3211	76 30 1	3204	77 56 6	3197
	Saturn W.	51 47 12	3095	53 15 28	3088	54 43 52	3081	56 12 25	3073
8	$\alpha$ Arietis W.	30 12 47	3116	31 40 37	3107	33 8 38	3098	34 36 50	3088
	Pollux E.	45 38 36	3110	44 10 39	3110	42 42 41	3108	41 14 41	3106
	Sun E.	99 7 50	3436	97 46 14	3431	96 24 33	3426	95 2 46	3420
	Jupiter W.	101 9 5	2975	102 39 49	2966	104 10 44	2958	105 41 49	2950
	$\alpha$ Pegasi W.	85 8 45	3156	86 35 47	3148	88 2 59	3138	89 30 22	3129
	Saturn W.	63 37 37	3030	65 7 12	3021	66 36 59	3011	68 6 58	3001

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
8	$\alpha$ Arietis	W.	36° 5' 14"	3078	37° 33' 50"	3069	39° 2' 37"	3060	40° 31' 35"	3051
	Mars	W.	19 5 1	3445	20 26 27	3401	21 48 43	3363	23 11 42	3330
	Pollux	E.	39 46 39	3105	38 18 35	3103	36 50 29	3101	35 22 21	3100
	SUN	E.	93 40 52	3413	92 18 50	3406	90 56 40	3399	89 34 22	3392
9	Saturn	W.	69 37 10	2990	71 7 35	2979	72 38 14	2968	74 9 7	2956
	$\alpha$ Arietis	W.	47 59 36	2997	49 29 53	2985	51 0 24	2974	52 31 9	2962
	Mars	W.	30 14 52	3908	31 40 52	3188	33 7 16	3168	34 34 4	3148
	SUN	E.	82 40 26	3344	81 17 5	3332	79 53 31	3321	78 29 44	3310
10	Saturn	W.	81 47 22	2993	83 19 50	2980	84 52 35	2966	86 25 38	2951
	$\alpha$ Arietis	W.	60 8 52	2997	61 41 15	2983	63 13 56	2969	64 46 55	2954
	Mars	W.	41 53 41	3057	43 22 43	3040	44 52 6	3029	46 21 51	3005
	Aldebaran	W.	28 39 24	3114	30 7 16	3079	31 35 51	3047	33 5 6	3017
11	SUN	E.	71 27 16	3944	70 1 59	3930	68 36 26	3916	67 10 36	3901
	Saturn	W.	94 15 36	2777	95 50 34	2762	97 25 52	2746	99 1 31	2731
	$\alpha$ Arietis	W.	72 36 39	2778	74 11 36	2762	75 46 54	2745	77 22 34	2729
	Mars	W.	53 56 12	2914	55 28 13	2906	57 0 37	2878	58 33 24	2859
12	Aldebaran	W.	40 40 3	2987	42 12 38	2964	43 45 43	2942	45 19 17	2919
	SUN	E.	59 56 52	3123	58 29 10	3106	57 1 8	3090	55 32 46	3073
	$\alpha$ Arietis	W.	85 26 22	2646	87 4 15	2629	88 42 31	2612	90 21 10	2594
	Mars	W.	66 23 20	2766	67 58 32	2748	69 34 8	2729	71 10 9	2711
13	Aldebaran	W.	53 14 13	2713	54 50 35	2693	56 27 24	2673	58 4 40	2653
	SUN	E.	18 5 47	2969	46 35 20	2971	45 4 31	2954	43 33 21	2936
	Mars	W.	79 16 23	2690	80 54 51	2603	82 33 44	2584	84 13 1	2566
	Aldebaran	W.	66 17 35	2559	67 57 27	2540	69 37 45	2522	71 18 27	2504
18	SUN	E.	35 52 18	2957	34 19 4	2943	32 45 32	2929	31 11 42	2916
	SUN	W.	31 19 2	2458	33 1 14	2455	34 43 30	2454	36 25 48	2454
	$\alpha$ Aquilæ	E.	95 54 44	2662	94 17 40	2650	92 40 33	2630	91 3 26	2609
	SUN	W.	44 57 1	2465	46 39 4	2468	48 21 2	2473	50 2 53	2479
19	$\alpha$ Aquilæ	E.	82 59 6	2713	81 22 43	2703	79 46 34	2735	78 10 41	2750
	Jupiter	E.	114 12 20	2199	112 21 55	2196	110 31 38	2133	108 41 29	2138
	SUN	W.	58 29 59	2513	60 10 54	2521	61 51 38	2530	63 32 10	2538
	$\alpha$ Aquilæ	E.	70 16 34	2644	68 43 3	2668	67 10 3	2694	65 37 37	2694
20	Jupiter	E.	99 33 3	2173	97 43 55	2180	95 54 58	2168	94 6 13	2197
	SUN	W.	71 51 39	2587	73 30 52	2597	75 9 51	2608	76 48 35	2619
	$\alpha$ Aquilæ	E.	58 5 29	3104	56 37 24	3149	55 10 14	3198	53 44 3	3251
	Fomalhaut	E.	81 31 28	2677	79 54 17	2692	78 17 26	2707	76 40 56	2723
21	Jupiter	E.	85 5 51	2944	83 18 29	2954	81 31 22	2964	79 44 29	2974
	$\alpha$ Pegasi	E.	102 20 8	2419	100 37 1	2426	98 54 6	2436	97 11 23	2445
	SUN	W.	84 58 31	2675	86 35 45	2686	88 12 44	2698	89 49 27	2709
	Antares	W.	16 5 37	2351	17 50 22	2362	19 34 52	2371	21 19 8	2381
22	$\alpha$ Aquilæ	E.	46 50 20	2594	45 31 39	2623	44 14 34	2781	42 59 12	2869
	Fomalhaut	E.	68 44 16	2921	67 10 16	2945	65 36 46	2989	64 3 47	2994
	Jupiter	E.	70 53 58	2326	69 8 39	2339	67 23 36	2350	65 38 49	2362

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Dif.	XVh.	P. L. of Dif.	XVIIIh.	P. L. of Dif.	XXIh.	P. L. of Dif.
8	$\alpha$ Arietis	W.	42° 0' 45"	3040	43° 30' 8"	3030	44° 59' 44"	3019	46° 29' 33"	3008
	Mars	W.	24 35 19	3301	25 59 29	3076	27 24 9	3259	28 49 17	3289
	Pollux	E.	33 54 11	3009	32 26 0	3009	30 57 49	3100	29 29 39	3101
	Sun	E.	88 11 56	3363	86 49 20	3373	85 26 33	3364	84 3 35	3354
9	Saturn	W.	75 40 15	3044	77 11 38	3039	78 43 16	3019	80 15 11	3006
	$\alpha$ Arietis	W.	54 2 9	3050	55 33 25	3037	57 4 57	3094	58 36 46	3010
	Mars	W.	36 1 15	3130	37 28 48	3119	38 56 43	3093	40 25 1	3075
	Sun	E.	77 5 44	3297	75 41 29	3285	74 17 0	3273	72 52 16	3258
10	Saturn	W.	87 59 0	3037	89 32 40	3033	91 6 39	3007	92 40 58	3703
	$\alpha$ Arietis	W.	66 20 13	3030	67 53 50	3025	69 27 46	3009	71 2 2	3703
	Mars	W.	47 51 58	3087	49 22 27	3080	50 53 19	3050	52 24 34	3033
	Aldebaran	W.	34 34 58	3089	36 5 25	3063	37 36 25	3036	39 7 58	3011
11	Sun	E.	65 44 28	3188	64 18 2	3171	62 51 18	3155	61 24 15	3138
	Saturn	W.	100 37 30	3715	102 13 50	3698	103 50 32	3683	105 27 35	3666
	$\alpha$ Arietis	W.	78 58 36	3713	80 34 59	3696	82 11 44	3679	83 48 52	3663
	Mars	W.	60 6 35	3641	61 40 10	3633	63 14 9	3604	64 48 32	3785
12	Aldebaran	W.	46 53 20	3797	48 27 52	3775	50 2 52	3755	51 38 19	3733
	Sun	E.	54 4 4	3056	52 35 1	3040	51 5 38	3003	49 35 53	3005
	$\alpha$ Arietis	W.	92 0 13	3678	93 39 38	3661	95 19 27	3644	96 59 39	3637
	Mars	W.	72 46 34	3699	74 23 24	3674	76 0 39	3655	77 38 19	3637
13	Aldebaran	W.	59 42 23	3634	61 20 32	3615	62 59 7	3596	64 38 8	3577
	Sun	E.	42 1 50	3021	40 29 58	3005	38 57 45	2989	37 25 12	2973
	Mars	W.	85 52 42	3649	87 32 47	3639	89 13 16	3615	90 54 8	3600
	Aldebaran	W.	72 59 34	3687	74 41 6	3670	76 23 2	3653	78 5 21	3637
18	Sun	E.	29 37 35	3004	28 3 12	2999	26 28 34	2989	24 53 43	2974
	$\alpha$ Aquilæ	W.	38 8 6	3454	39 50 24	3455	41 32 40	3458	43 14 53	3461
	Sun	E.	89 26 22	3085	87 49 22	3080	86 12 28	3065	84 35 42	3050
	$\alpha$ Aquilæ	E.	51 44 36	3485	53 26 11	3491	55 7 37	3498	56 48 53	3505
19	$\alpha$ Aquilæ	E.	76 35 7	3765	74 50 53	3769	73 25 1	3801	71 50 34	3831
	Jupiter	E.	106 51 28	3144	105 1 36	3151	103 11 54	3158	101 22 23	3165
	Sun	W.	65 12 30	3548	66 52 37	3557	68 32 31	3567	70 12 12	3577
	$\alpha$ Aquilæ	E.	64 5 48	3054	62 34 38	3067	61 4 9	3083	59 34 25	3099
20	Jupiter	E.	92 17 41	3206	90 29 23	3215	88 41 18	3225	86 53 27	3235
	Sun	W.	78 27 4	3009	80 5 19	3041	81 43 18	3059	83 21 2	3083
	$\alpha$ Aquilæ	E.	52 18 54	3308	50 54 52	3371	49 32 2	3439	48 10 30	3513
	Fomalhaut	E.	75 4 47	3741	73 29 1	3759	71 53 39	3779	70 18 44	3800
21	Jupiter	E.	77 57 52	3285	76 11 30	3296	74 25 24	3306	72 39 33	3317
	$\alpha$ Pegasi	E.	95 28 52	3455	93 46 35	3464	92 4 31	3475	90 22 42	3485
	Sun	W.	91 25 55	3731	93 2 7	3733	94 38 3	3744	96 13 44	3756
	Antares	W.	23 3 10	3391	24 46 57	3401	26 30 30	3411	28 13 49	3422
22	$\alpha$ Aquilæ	E.	41 45 41	4008	40 34 9	4140	39 24 46	4288	38 17 42	4433
	Fomalhaut	E.	62 31 21	3922	60 59 30	3951	59 28 16	3989	57 57 41	4014
	Jupiter	E.	63 54 19	3373	62 10 5	3384	60 26 7	3396	58 42 26	3407

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
22	$\alpha$ Pegasi E.	88 41 7	9495	86 59 47	9507	85 18 43	9518	83 37 55	9530
	Saturn E.	109 9 12	9365	107 24 47	9375	105 40 36	9384	103 56 39	9394
23	Sun W.	97 49 10	9767	99 24 21	9779	100 59 16	9791	102 33 56	9803
	Antares W.	29 56 53	9439	31 39 42	9443	33 22 16	9453	35 4 35	9464
	Fomalhaut E.	56 27 46	9049	54 58 34	9067	53 30 8	9187	52 2 31	9169
	Jupiter E.	56 59 1	9418	55 15 52	9436	53 33 0	9441	51 50 24	9453
	$\alpha$ Pegasi E.	75 18 6	9593	73 39 1	9607	72 0 15	9621	70 21 48	9635
	Saturn E.	95 20 30	9445	93 38 0	9456	91 55 45	9467	90 13 45	9477
24	Sun W.	110 23 26	9861	111 56 35	9873	113 29 30	9883	115 2 10	9895
	Antares W.	43 32 31	9515	45 13 24	9525	46 54 2	9535	48 34 26	9545
	Jupiter E.	43 21 37	9513	41 40 42	9506	40 0 5	9539	38 19 46	9559
	Fomalhaut E.	44 58 30	9441	43 37 0	9511	42 16 48	9587	40 57 59	9671
	$\alpha$ Pegasi E.	62 14 31	9718	60 38 7	9739	59 2 5	9746	57 26 26	9765
	Saturn E.	81 47 25	9530	80 6 53	9540	78 26 36	9551	76 46 34	9561
	$\alpha$ Arietis E.	104 20 6	9531	102 39 36	9549	100 59 21	9559	99 19 20	9561
25	Sun W.	122 41 51	9959	124 13 4	9963	125 44 3	9974	127 14 48	9986
	Antares W.	56 52 59	9594	58 32 2	9604	60 10 51	9614	61 49 27	9624
	$\alpha$ Pegasi E.	49 34 33	9689	48 1 34	9693	46 29 6	9619	44 57 11	9646
	Saturn E.	68 30 1	9615	66 51 26	9626	65 13 6	9636	63 35 0	9647
	$\alpha$ Arietis E.	91 2 36	9610	89 23 55	9621	87 45 28	9630	86 7 14	9640
26	Antares W.	69 59 16	9669	71 36 37	9678	73 13 46	9688	74 50 42	9697
	Saturn E.	55 28 13	9709	53 51 36	9714	52 15 15	9726	50 39 10	9738
	$\alpha$ Arietis E.	77 59 16	9687	76 22 18	9696	74 45 33	9705	73 9 0	9714
	Mars E.	100 17 41	9741	98 41 56	9750	97 6 23	9759	95 31 1	9767
27	Antares W.	82 52 26	9741	84 28 12	9749	86 3 47	9757	87 39 11	9766
	$\alpha$ Aquilæ W.	39 4 42	4596	40 8 11	4416	41 13 18	4319	42 19 53	4233
	Saturn E.	42 42 46	9609	41 8 21	9617	39 34 15	9639	38 0 29	9646
	$\alpha$ Arietis E.	65 9 20	9761	63 34 1	9770	61 58 54	9779	60 23 58	9788
	Mars E.	87 36 53	9808	86 2 35	9816	84 28 28	9824	82 54 31	9833
	Aldebaran E.	97 41 50	9794	96 7 14	9802	94 32 49	9811	92 58 35	9818
28	Antares W.	95 33 25	9808	97 7 43	9815	98 41 51	9824	100 15 48	9833
	$\alpha$ Aquilæ W.	48 10 25	3923	49 23 21	3880	50 37 1	3849	51 51 20	3807
	Saturn E.	30 17 12	9646	28 45 51	9673	27 15 3	9601	25 44 51	9634
	$\alpha$ Arietis E.	52 32 21	9835	50 58 38	9844	49 25 7	9854	47 51 49	9863
	Mars E.	75 7 22	9873	73 34 27	9880	72 1 42	9888	70 29 8	9896
	Aldebaran E.	85 16 5	9861	83 36 56	9869	82 3 57	9877	80 31 9	9886
29	$\alpha$ Aquilæ W.	58 10 55	3678	59 28 5	3661	60 45 34	3645	62 3 20	3631
	Jupiter W.	22 21 10	9939	23 52 40	9935	25 24 15	9933	26 55 52	9939
	$\alpha$ Arietis E.	40 8 26	9914	38 36 25	9924	37 4 37	9935	35 33 3	9947
	Mars E.	62 48 49	9936	61 17 16	9943	59 45 52	9951	58 14 38	9960
	Aldebaran E.	72 49 55	9939	71 18 13	9939	69 46 43	9947	68 15 24	9956
30	$\alpha$ Aquilæ W.	68 35 22	3584	69 54 14	3578	71 13 12	3574	72 32 15	3571
	Jupiter W.	34 33 39	9945	36 5 1	9949	37 36 18	9953	39 7 30	9957
	Mars E.	50 41 3	3000	49 10 50	3009	47 40 48	3017	46 10 56	3025
	Aldebaran E.	60 41 37	3001	59 11 26	3011	57 41 27	3021	56 11 40	3030

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
22	$\alpha$ Pegasi E.	81 57 23	9549	80 17 ' 8	9554	78 37 10	9568	76 57 29	9580
	Saturn E.	102 12 56	9405	100 29 28	9415	98 46 14	9425	97 3 15	9435
23	Sun W.	104 8 20	9815	105 42 29	9896	107 16 23	9838	108 50 2	9849
	Antares W.	36 46 39	9475	38 28 28	9485	40 10 3	9494	41 51 24	9504
	Fomalhaut E.	50 35 45	9315	49 9 54	9385	47 45 2	9319	46 21 12	9378
	Jupiter E.	50 8 5	9465	48 26 3	9477	46 44 18	9489	45 2 49	9501
	$\alpha$ Pegasi E.	68 43 40	9649	67 5 52	9664	65 28 24	9680	63 51 17	9695
	Saturn E.	88 32 0	9487	86 50 29	9498	85 9 13	9509	83 28 12	9519
24	Sun W.	116 34 35	9906	118 6 46	9918	119 38 42	9939	121 10 24	9941
	Antares W.	50 14 36	9556	51 54 32	9566	53 34 14	9575	55 13 43	9585
	Jupiter E.	36 39 45	9566	35 0 3	9579	33 20 39	9593	31 41 35	9609
	Fomalhaut E.	39 40 41	9764	38 25 1	9866	37 11 7	9861	35 59 9	4111
	$\alpha$ Pegasi E.	55 51 12	9784	54 16 23	9803	52 41 59	9894	51 8 2	9845
	Saturn E.	75 6 46	9573	73 27 13	9583	71 47 54	9593	70 8 50	9604
	$\alpha$ Arietis E.	97 39 32	9573	95 59 58	9581	94 20 37	9591	92 41 30	9601
25	Sun W.	128 45 18	9997	130 15 34	3009	131 45 36	3030	133 15 24	3030
	Antares W.	63 27 50	9633	65 6 0	9649	66 43 58	9658	68 21 43	9660
	$\alpha$ Pegasi E.	43 25 51	9677	41 55 9	3009	40 25 7	3043	38 55 47	3080
	Saturn E.	61 57 9	9658	60 19 33	9669	58 42 12	9680	57 5 5	9691
	$\alpha$ Arietis E.	84 29 13	9649	82 51 25	9658	81 13 49	9668	79 36 26	9678
26	Antares W.	76 27 26	9706	78 3 58	9714	79 40 19	9723	81 16 28	9739
	Saturn E.	49 3 20	9750	47 27 46	9763	45 52 29	9775	44 17 20	9788
	$\alpha$ Arietis E.	71 32 39	9794	69 56 31	9733	68 20 35	9748	66 44 51	9758
	Mars E.	93 55 50	9775	92 20 50	9783	90 46 0	9792	89 11 21	9800
27	Antares W.	89 14 24	9774	90 49 26	9783	92 24 16	9791	93 58 56	9799
	$\alpha$ Aquilæ W.	43 27 48	4157	44 36 55	4089	45 47 7	4098	46 58 19	3973
	Saturn E.	36 27 3	9865	34 53 59	9883	33 21 18	9909	31 49 2	9993
	$\alpha$ Arietis E.	58 49 14	9797	57 14 42	9807	55 40 23	9816	54 6 16	9825
	Mars E.	81 20 44	9840	79 47 8	9848	78 13 42	9856	76 40 27	9864
	Aldebaran E.	91 24 31	9897	89 50 38	9835	88 16 56	9844	86 43 25	9852
28	Antares W.	101 49 34	9840	103 23 10	9848	104 56 36	9855	106 29 52	9864
	$\alpha$ Aquilæ W.	53 6 15	3775	54 21 43	3746	55 37 41	3721	56 54 6	3696
	Saturn E.	24 15 20	3071	22 46 35	3114	21 18 43	3168	19 51 55	3231
	$\alpha$ Arietis E.	46 18 43	9873	44 45 50	9883	43 13 9	9893	41 40 41	9903
	Mars E.	68 56 44	9904	67 24 30	9912	65 52 26	9920	64 20 32	9928
	Aldebaran E.	78 58 32	9894	77 26 6	9903	75 53 51	9912	74 21 47	9921
29	$\alpha$ Aquilæ W.	63 21 21	3819	64 39 35	3808	65 58 1	3598	67 16 37	3590
	Jupiter W.	28 27 30	9833	29 59 7	9835	31 30 41	9838	33 2 12	9841
	$\alpha$ Arietis E.	34 1 44	9859	32 30 40	9872	30 59 52	9885	29 29 21	9899
	Mars E.	56 43 35	9868	55 12 42	9878	53 41 59	9884	52 11 26	9898
	Aldebaran E.	66 44 16	9865	65 13 19	9874	63 42 34	9883	62 12 0	9892
30	$\alpha$ Aquilæ W.	73 51 21	3568	75 10 30	3565	76 29 42	3565	77 48 55	3564
	Jupiter W.	40 38 37	9869	42 9 38	9867	43 40 32	9878	45 11 20	9877
	Mars E.	44 41 14	3034	43 11 43	3043	41 42 23	3059	40 13 14	3069
	Aldebaran E.	54 42 4	3039	53 12 40	3050	51 43 29	3060	50 14 31	3071

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.				
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.					Diff. for 1 hour.	Semi-diameter.		
		h	m	s		°	'						"	
Wed.	1	12	29	6.09	9.051	S. 3	8	41.2	-58.25	16	1.44	64.35	10 15.55	0.803
Thur.	2	12	32	43.48	9.064	3	31	58.5	58.17	16	1.72	64.40	10 34.66	0.790
Frid.	3	12	36	21.17	9.077	3	55	13.5	58.07	16	1.99	64.45	10 53.47	0.777
Sat.	4	12	39	59.20	9.092	4	18	25.8	57.95	16	2.26	64.50	11 11.95	0.762
Sun.	5	12	43	37.59	9.107	4	41	35.1	57.82	16	2.53	64.55	11 30.06	0.747
Mon.	6	12	47	16.37	9.124	5	4	41.1	57.67	16	2.81	64.60	11 47.79	0.730
Tues.	7	12	50	55.55	9.141	5	27	43.3	57.51	16	3.08	64.66	12 5.11	0.713
Wed.	8	12	54	35.15	9.159	5	50	41.5	57.33	16	3.36	64.72	12 22.02	0.695
Thur.	9	12	58	15.19	9.178	6	13	35.2	57.14	16	3.63	64.79	12 38.48	0.676
Frid.	10	13	1	55.71	9.198	6	36	24.3	56.93	16	3.90	64.86	12 54.48	0.656
Sat.	11	13	5	36.72	9.218	6	59	8.2	56.70	16	4.17	64.93	13 9.99	0.636
Sun.	12	13	9	18.21	9.240	7	21	46.2	56.47	16	4.45	65.00	13 25.00	0.615
Mon.	13	13	13	0.22	9.262	7	44	18.3	56.20	16	4.72	65.08	13 39.49	0.593
Tues.	14	13	16	42.77	9.284	8	6	44.1	55.93	16	4.99	65.15	13 53.47	0.571
Wed.	15	13	20	25.87	9.307	8	29	3.1	55.64	16	5.26	65.23	14 6.89	0.548
Thur.	16	13	24	9.51	9.331	8	51	14.9	55.33	16	5.54	65.31	14 19.76	0.524
Frid.	17	13	27	53.74	9.355	9	13	19.1	55.01	16	5.81	65.40	14 32.05	0.500
Sat.	18	13	31	38.56	9.380	9	35	15.4	54.67	16	6.09	65.49	14 43.75	0.475
Sun.	19	13	35	23.99	9.405	9	57	3.2	54.31	16	6.36	65.58	14 54.84	0.449
Mon.	20	13	39	10.03	9.431	10	18	42.1	53.93	16	6.64	65.67	15 5.33	0.423
Tues.	21	13	42	56.70	9.457	10	40	11.7	53.54	16	6.91	65.77	15 15.20	0.396
Wed.	22	13	46	44.01	9.484	11	1	31.9	53.13	16	7.18	65.87	15 24.42	0.369
Thur.	23	13	50	31.98	9.513	11	22	41.9	52.70	16	7.45	65.97	15 32.98	0.342
Frid.	24	13	54	20.61	9.541	11	43	41.5	52.26	16	7.72	66.07	15 40.88	0.314
Sat.	25	13	58	9.93	9.570	12	4	30.5	51.81	16	7.99	66.17	15 48.09	0.286
Sun.	26	14	1	59.96	9.600	12	25	8.3	51.34	16	8.26	66.27	15 54.61	0.256
Mon.	27	14	5	50.71	9.630	12	45	34.8	50.85	16	8.52	66.38	16 0.39	0.226
Tues.	28	14	9	42.19	9.661	13	5	49.1	50.34	16	8.78	66.49	16 5.46	0.195
Wed.	29	14	13	34.42	9.692	13	25	51.2	49.82	16	9.04	66.60	16 9.78	0.164
Thur.	30	14	17	27.40	9.724	13	45	40.6	49.28	16	9.30	66.71	16 13.34	0.132
Frid.	31	14	21	21.17	9.757	14	5	17.1	48.73	16	9.55	66.82	16 16.10	0.099
Sat.	32	14	25	15.75	9.790	S. 14	24	39.9	-48.16	16	9.80	66.93	16 18.08	0.066

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.

— prefixed to the hourly change of declination indicates that south declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Wed.	1	<sup>h</sup> 12 <sup>m</sup> 29 <sup>s</sup> 7.65	9.053	S. <sup>°</sup> 3 <sup>'</sup> 8 <sup>"</sup> 51.3	58.27	<sup>m</sup> 10 <sup>s</sup> 15.68	0.803	<sup>h</sup> 12 <sup>m</sup> 39 <sup>s</sup> 23.33
Thur.	2	12 32 45.09	9.066	3 32 8.8	58.18	10 34.80	0.790	12 43 19.89
Frid.	3	12 36 22.83	9.079	3 55 24.0	58.08	10 53.61	0.777	12 47 16.44
Sat.	4	12 40 0.91	9.094	4 18 36.6	57.96	11 12.09	0.762	12 51 13.00
Sun.	5	12 43 39.35	9.109	4 41 46.2	57.83	11 30.20	0.747	12 55 9.55
Mon.	6	12 47 18.17	9.126	5 4 52.5	57.68	11 47.93	0.730	12 59 6.10
Tues.	7	12 50 57.40	9.143	5 27 54.9	57.52	12 5.25	0.713	13 3 2.65
Wed.	8	12 54 37.05	9.161	5 50 53.3	57.34	12 22.16	0.695	13 6 59.21
Thur.	9	12 58 17.14	9.180	6 13 47.3	57.15	12 38.62	0.676	13 10 55.76
Frid.	10	13 1 57.70	9.200	6 36 36.6	56.94	12 54.62	0.656	13 14 52.32
Sat.	11	13 5 38.75	9.220	6 59 20.5	56.71	13 10.13	0.636	13 18 48.86
Sun.	12	13 9 20.28	9.242	7 21 58.9	56.48	13 25.14	0.615	13 22 45.42
Mon.	13	13 13 2.34	9.264	7 44 31.2	56.21	13 39.63	0.593	13 26 41.97
Tues.	14	13 16 44.93	9.286	8 6 57.1	55.94	13 53.60	0.571	13 30 38.53
Wed.	15	13 20 28.07	9.309	8 29 16.2	55.65	14 7.02	0.548	13 34 35.08
Thur.	16	13 24 11.75	9.333	8 51 28.1	55.34	14 19.89	0.524	13 38 31.64
Frid.	17	13 27 56.01	9.357	9 13 32.4	55.02	14 32.18	0.500	13 42 28.19
Sat.	18	13 31 40.87	9.382	9 35 28.8	54.67	14 43.87	0.478	13 46 24.75
Sun.	19	13 35 26.34	9.407	9 57 16.7	54.31	14 54.96	0.449	13 50 21.29
Mon.	20	13 39 12.41	9.433	10 18 55.7	53.93	15 5.44	0.423	13 54 17.85
Tues.	21	13 42 59.11	9.459	10 40 25.4	53.54	15 15.29	0.396	13 58 14.40
Wed.	22	13 46 46.45	9.486	11 1 45.6	53.13	15 24.51	0.369	14 2 10.96
Thur.	23	13 50 34.45	9.514	11 22 55.6	52.70	15 33.07	0.342	14 6 7.51
Frid.	24	13 54 23.11	9.542	11 43 55.2	52.26	15 40.96	0.314	14 10 4.07
Sat.	25	13 58 12.46	9.571	12 4 44.1	51.81	15 48.16	0.286	14 14 0.62
Sun.	26	14 2 2.51	9.601	12 25 21.9	51.34	15 54.67	0.256	14 17 57.18
Mon.	27	14 5 53.28	9.631	12 45 48.3	50.85	16 0.45	0.226	14 21 53.73
Tues.	28	14 9 44.78	9.662	13 6 2.6	50.34	16 5.51	0.195	14 25 50.29
Wed.	29	14 13 37.03	9.693	13 26 4.6	49.82	16 9.82	0.164	14 29 46.84
Thur.	30	14 17 30.03	9.725	13 45 53.9	49.28	16 13.37	0.132	14 33 43.40
Frid.	31	14 21 23.82	9.758	14 5 30.2	48.73	16 16.13	0.099	14 37 39.95
Sat.	32	14 25 18.41	9.791	S. 14 24 53.0	48.16	16 18.10	0.066	14 41 36.51

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

— prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 hour.  
+ 9°.8565  
(Table III.)



AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal $\odot$ .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	274	187 <sup>o</sup> 56' 7.1	55' 13.7	147.58	+0.98	0.0002512	-51.8	<sup>h</sup> 11 <sup>m</sup> 18 <sup>s</sup> 45.16	
2	275	188 55 10.2	54 16.7	147.67	0.98	.0001271	51.7	11 14 49.26	
3	276	189 54 15.6	53 22.0	147.77	0.95	.0000034	51.5	11 10 53.35	
4	277	190 53 23.2	52 29.5	147.86	0.87	9.9998800	51.3	11 6 57.44	
5	278	191 52 32.8	51 39.0	147.95	0.78	.9997570	51.2	11 3 1.53	
6	279	192 51 44.8	50 50.9	148.05	0.66	.9996343	51.1	10 59 5.63	
7	280	193 50 59.2	50 5.2	148.15	0.53	.9995118	51.0	10 55 9.72	
8	281	194 50 16.1	49 22.0	148.24	0.40	.9993895	51.0	10 51 13.81	
9	282	195 49 35.2	48 41.0	148.33	0.27	.9992674	50.9	10 47 17.90	
10	283	196 48 56.5	48 2.2	148.42	0.14	.9991452	50.9	10 43 22.00	
11	284	197 48 20.2	47 25.8	148.52	+0.03	.9990229	51.0	10 39 26.09	
12	285	198 47 46.1	46 51.6	148.62	-0.06	.9989004	51.1	10 35 30.18	
13	286	199 47 14.3	46 19.7	148.72	0.12	.9987777	51.2	10 31 34.27	
14	287	200 46 44.7	45 50.0	148.81	0.16	.9986548	51.3	10 27 38.37	
15	288	201 46 17.1	45 22.3	148.89	0.17	.9985316	51.4	10 23 42.46	
16	289	202 45 51.6	44 56.7	148.98	0.14	.9984083	51.4	10 19 46.55	
17	290	203 45 28.1	44 33.0	149.06	0.10	.9982847	51.5	10 15 50.64	
18	291	204 45 6.4	44 11.2	149.14	-0.02	.9981609	51.5	10 11 54.74	
19	292	205 44 46.4	43 51.1	149.21	+0.09	.9980371	51.5	10 7 58.83	
20	293	206 44 28.3	43 32.9	149.28	0.21	.9979134	51.4	10 4 2.92	
21	294	207 44 12.0	43 16.5	149.35	0.34	.9977901	51.3	10 0 7.01	
22	295	208 43 57.5	43 1.8	149.43	0.48	.9976673	51.1	9 56 11.11	
23	296	209 43 44.7	42 48.9	149.50	0.61	.9975450	50.8	9 52 15.20	
24	297	210 43 33.6	42 37.7	149.57	0.72	.9974234	50.5	9 48 19.29	
25	298	211 43 24.1	42 28.1	149.64	0.83	.9973027	50.1	9 44 23.38	
26	299	212 43 16.2	42 20.1	149.72	0.90	.9971830	49.6	9 40 27.47	
27	300	213 43 10.1	42 13.9	149.79	0.96	.9970645	49.1	9 36 31.56	
28	301	214 43 5.9	42 9.5	149.86	0.98	.9969473	48.5	9 32 35.65	
29	302	215 43 3.4	42 6.9	149.93	0.97	.9968315	47.9	9 28 39.74	
30	303	216 43 2.7	42 6.1	150.01	0.93	.9967172	47.3	9 24 43.83	
31	304	217 43 3.9	42 7.1	150.09	0.88	.9966045	46.6	9 20 47.92	
32	305	218 43 7.0	42 10.0	150.17	+0.78	9.9964932	-46.0	9 16 52.01	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>d</sup> .0.									Diff. for 1 hour. — 9 <sup>m</sup> .8296 (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup> <sup>d</sup>	
1	14 53.2	14 50.9	54 31.0	-0.74	54 22.7	-0.64	12 51.0	1.82	15.3
2	14 49.0	14 47.4	54 15.6	0.53	54 9.9	0.41	13 35.6	1.90	16.3
3	14 46.3	14 45.7	54 5.8	-0.27	54 3.4	-0.13	14 21.9	1.98	17.3
4	14 45.5	14 45.9	54 2.8	+0.03	54 4.2	+0.21	15 10.2	2.05	18.3
5	14 46.8	14 48.5	54 7.9	0.40	54 13.8	0.59	16 0.0	2.10	19.3
6	14 50.7	14 53.6	54 22.0	0.78	54 32.6	0.98	16 50.7	2.12	20.3
7	14 57.2	15 1.4	54 45.7	1.19	55 1.3	1.40	17 41.4	2.10	21.3
8	15 6.3	15 11.8	55 19.2	1.59	55 39.4	1.77	18 31.6	2.07	22.3
9	15 17.9	15 24.5	56 1.9	1.95	56 26.3	2.10	19 20.8	2.03	23.3
10	15 31.6	15 39.1	56 52.3	2.23	57 19.7	2.32	20 9.3	2.01	24.3
11	15 46.6	15 54.5	57 47.9	2.37	58 16.5	2.37	20 57.6	2.02	25.3
12	16 2.3	16 9.7	58 44.8	2.32	59 12.2	2.22	21 46.4	2.06	26.3
13	16 16.8	16 23.2	59 38.1	2.07	60 1.7	1.85	22 36.9	2.15	27.3
14	16 28.8	16 33.6	60 22.5	1.59	60 39.8	1.27	23 30.1	2.29	28.3
15	16 37.2	16 39.6	60 53.0	0.92	61 1.8	+0.54	δ		29.3
16	16 40.7	16 40.6	61 6.0	+0.15	61 5.5	-0.23	0 26.8	2.45	0.9
17	16 39.2	16 36.7	61 0.5	-0.59	60 51.2	0.93	1 27.3	2.50	1.9
18	16 33.1	16 28.6	60 38.0	1.23	60 21.4	1.50	2 30.3	2.66	2.9
19	16 23.3	16 17.4	60 2.0	1.71	59 40.4	1.86	3 33.9	2.62	3.9
20	16 11.1	16 4.5	59 17.3	1.96	58 53.2	2.02	4 35.4	2.47	4.9
21	15 57.9	15 51.2	58 28.7	2.03	58 4.3	2.01	5 32.9	2.29	5.9
22	15 44.7	15 38.4	57 40.4	1.96	57 17.2	1.86	6 25.7	2.11	6.9
23	15 32.4	15 26.7	56 55.2	1.79	56 34.2	1.69	7 14.3	1.94	7.9
24	15 21.4	15 16.4	56 14.7	1.58	55 56.4	1.46	7 59.5	1.83	8.9
25	15 11.8	15 7.6	55 39.6	1.35	55 24.1	1.24	8 42.5	1.76	9.9
26	15 3.7	15 0.2	55 9.8	1.13	54 56.9	1.02	9 24.4	1.73	10.9
27	14 57.1	14 54.3	54 45.4	0.91	54 35.2	0.80	10 6.0	1.75	11.9
28	14 51.8	14 49.7	54 26.2	0.70	54 18.5	0.59	10 48.5	1.80	12.9
29	14 47.9	14 46.5	54 11.9	0.49	54 6.6	0.40	11 32.4	1.87	13.9
30	14 45.4	14 44.6	54 2.4	0.30	53 59.4	-0.19	12 18.2	1.95	14.9
31	14 44.1	14 44.0	53 57.8	-0.08	53 57.6	+0.04	13 5.9	2.03	15.9
32	14 44.4	14 45.1	53 58.8	+0.16	54 1.6	+0.30	13 55.3	2.06	16.9

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 1.					FRIDAY 3.				
0	1 7 43.53	1.9049	N.12° 36' 50.8"	11.589	0	2 42 0.02	2.0392	N.20° 34' 6.7"	8.021
1	1 9 37.88	1.9068	12 48 24.4	11.532	1	2 44 2.04	2.0352	20 42 5.2	7.928
2	1 11 32.35	1.9089	12 59 54.6	11.474	2	2 46 4.24	2.0382	20 49 58.1	7.836
3	1 13 26.95	1.9110	13 11 21.3	11.416	3	2 48 6.63	2.0413	20 57 45.5	7.743
4	1 15 21.67	1.9131	13 22 44.5	11.356	4	2 50 9.20	2.0444	21 5 27.3	7.649
5	1 17 16.52	1.9152	13 34 4.0	11.295	5	2 52 11.96	2.0475	21 13 3.4	7.555
6	1 19 11.49	1.9173	13 45 19.9	11.235	6	2 54 14.90	2.0505	21 20 33.9	7.461
7	1 21 6.59	1.9195	13 56 32.2	11.173	7	2 56 18.02	2.0536	21 27 58.7	7.365
8	1 23 1.83	1.9217	14 7 40.7	11.111	8	2 58 21.33	2.0567	21 35 17.7	7.268
9	1 24 57.20	1.9240	14 18 45.5	11.048	9	3 0 24.82	2.0597	21 42 30.9	7.171
10	1 26 52.71	1.9263	14 29 46.5	10.984	10	3 2 28.49	2.0627	21 49 38.3	7.074
11	1 28 48.36	1.9287	14 40 43.6	10.919	11	3 4 32.34	2.0657	21 56 39.8	6.976
12	1 30 44.15	1.9310	14 51 36.8	10.854	12	3 6 36.38	2.0688	22 3 35.4	6.877
13	1 32 40.08	1.9334	15 2 26.1	10.788	13	3 8 40.60	2.0718	22 10 25.1	6.778
14	1 34 36.16	1.9359	15 13 11.4	10.721	14	3 10 45.00	2.0747	22 17 8.8	6.678
15	1 36 32.39	1.9383	15 23 52.6	10.653	15	3 12 49.57	2.0777	22 23 46.5	6.578
16	1 38 28.76	1.9408	15 34 29.8	10.586	16	3 14 54.32	2.0807	22 30 18.2	6.477
17	1 40 25.28	1.9433	15 45 2.9	10.517	17	3 16 59.26	2.0838	22 36 43.8	6.375
18	1 42 21.96	1.9459	15 55 31.8	10.447	18	3 19 4.38	2.0868	22 43 3.2	6.272
19	1 44 18.79	1.9485	16 5 56.5	10.376	19	3 21 9.67	2.0897	22 49 16.5	6.170
20	1 46 15.78	1.9511	16 16 16.9	10.305	20	3 23 15.14	2.0928	22 55 23.6	6.067
21	1 48 12.92	1.9537	16 26 33.1	10.233	21	3 25 20.78	2.0955	23 1 24.5	5.963
22	1 50 10.22	1.9564	16 36 44.9	10.160	22	3 27 26.60	2.0984	23 7 19.1	5.857
23	1 52 7.69	1.9591	N.16 46 52.3	10.086	23	3 29 32.59	2.1013	N.23 13 7.4	5.752
THURSDAY 2.					SATURDAY 4.				
0	1 54 5.32	1.9618	N.16 56 55.2	10.012	0	3 31 38.75	2.1042	N.23 18 49.4	5.647
1	1 56 3.11	1.9646	17 6 53.7	9.937	1	3 33 45.09	2.1070	23 24 25.1	5.541
2	1 58 1.07	1.9673	17 16 47.7	9.862	2	3 35 51.59	2.1098	23 29 54.3	5.434
3	1 59 59.19	1.9701	17 26 37.1	9.785	3	3 37 58.26	2.1126	23 35 17.1	5.327
4	2 1 57.48	1.9729	17 36 21.9	9.708	4	3 40 5.10	2.1153	23 40 33.5	5.219
5	2 3 55.94	1.9757	17 46 2.1	9.631	5	3 42 12.10	2.1180	23 45 43.4	5.110
6	2 5 54.56	1.9785	17 55 37.6	9.552	6	3 44 19.26	2.1208	23 50 46.7	5.001
7	2 7 53.36	1.9814	18 5 8.3	9.473	7	3 46 26.59	2.1235	23 55 43.5	4.892
8	2 9 52.33	1.9843	18 14 34.3	9.393	8	3 48 34.08	2.1261	24 0 33.7	4.783
9	2 11 51.48	1.9873	18 23 55.5	9.312	9	3 50 41.72	2.1287	24 5 17.3	4.671
10	2 13 50.80	1.9901	18 33 11.8	9.231	10	3 52 49.52	2.1313	24 9 54.2	4.560
11	2 15 50.29	1.9930	18 42 23.2	9.149	11	3 54 57.48	2.1340	24 14 24.5	4.449
12	2 17 49.96	1.9960	18 51 29.7	9.067	12	3 57 5.60	2.1366	24 18 48.1	4.337
13	2 19 49.81	1.9990	19 0 31.2	8.983	13	3 59 13.87	2.1391	24 23 4.9	4.224
14	2 21 49.84	2.0019	19 9 27.7	8.899	14	4 1 22.29	2.1415	24 27 15.0	4.112
15	2 23 50.04	2.0048	19 18 19.1	8.814	15	4 3 30.85	2.1439	24 31 18.3	3.998
16	2 25 50.42	2.0078	19 27 5.4	8.728	16	4 5 39.56	2.1463	24 35 14.8	3.884
17	2 27 50.98	2.0109	19 35 46.5	8.642	17	4 7 48.41	2.1487	24 39 4.4	3.770
18	2 29 51.73	2.0140	19 44 22.4	8.555	18	4 9 57.40	2.1510	24 42 47.2	3.656
19	2 31 52.66	2.0170	19 52 53.1	8.467	19	4 12 6.53	2.1533	24 46 23.1	3.540
20	2 33 53.77	2.0200	20 1 18.5	8.379	20	4 14 15.80	2.1557	24 49 52.0	3.424
21	2 35 55.06	2.0230	20 9 38.6	8.290	21	4 16 25.21	2.1579	24 53 14.0	3.308
22	2 37 56.53	2.0260	20 17 53.3	8.201	22	4 18 34.75	2.1601	24 56 29.0	3.193
23	2 39 58.18	2.0291	20 26 2.7	8.112	23	4 20 44.42	2.1622	24 59 37.0	3.076
24	2 42 0.02	2.0322	N.20 34 6.7	8.021	24	4 22 54.21	2.1643	N.25 2 38.1	2.959

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 5.					TUESDAY 7.				
0	4 22 54.21	2.1643	N.25° 2' 38.1"	2.959	0	6 8 19.82	2.9094	N.25° 4' 24.9"	2.944
1	4 25 4.13	2.1663	25 5 32.1	2.941	1	6 10 32.38	2.9093	25 1 24.5	3.069
2	4 27 14.17	2.1684	25 8 19.0	2.792	2	6 12 44.92	2.9088	24 58 16.6	3.193
3	4 29 24.34	2.1704	25 10 58.8	2.604	3	6 14 57.44	2.9085	24 55 1.3	3.317
4	4 31 34.62	2.1723	25 13 31.5	2.486	4	6 17 9.94	2.9081	24 51 38.5	3.442
5	4 33 45.01	2.1742	25 15 57.1	2.367	5	6 19 22.41	2.9076	24 48 8.2	3.567
6	4 35 55.52	2.1761	25 18 15.5	2.247	6	6 21 34.85	2.9071	24 44 30.5	3.691
7	4 38 6 14	2.1778	25 20 26.7	2.127	7	6 23 47.26	2.9066	24 40 45.3	3.815
8	4 40 16.86	2.1796	25 22 30.8	2.008	8	6 25 59.64	2.9060	24 36 52.7	3.938
9	4 42 27.69	2.1813	25 24 27.7	1.888	9	6 28 11.98	2.9054	24 32 52.7	4.062
10	4 44 38.62	2.1830	25 26 17.3	1.767	10	6 30 24.29	2.9048	24 28 45.3	4.185
11	4 46 49.65	2.1847	25 27 59.7	1.647	11	6 32 36.56	2.9041	24 24 30.5	4.309
12	4 49 0.78	2.1863	25 29 34.9	1.526	12	6 34 48.78	2.9033	24 20 8.2	4.433
13	4 51 12.00	2.1878	25 31 2.8	1.404	13	6 37 0.96	2.9026	24 15 38.5	4.556
14	4 53 23.31	2.1893	25 32 23.4	1.282	14	6 39 13.09	2.9018	24 11 1.5	4.678
15	4 55 34.70	2.1906	25 33 36.6	1.159	15	6 41 25.17	2.9009	24 6 17.2	4.800
16	4 57 46.18	2.1920	25 34 42.5	1.037	16	6 43 37.20	2.9001	24 1 25.5	4.922
17	4 59 57.74	2.1933	25 35 41.1	0.915	17	6 45 49.18	2.1992	23 56 26.5	5.045
18	5 2 9.38	2.1946	25 36 32.3	0.792	18	6 48 1.10	2.1989	23 51 20.1	5.167
19	5 4 21.09	2.1958	25 37 16.1	0.669	19	6 50 12.96	2.1979	23 46 6.4	5.288
20	5 6 32.88	2.1971	25 37 52.6	0.547	20	6 52 24.76	2.1969	23 40 45.5	5.409
21	5 8 44.74	2.1982	25 38 21.7	0.423	21	6 54 36.51	2.1959	23 35 17.3	5.530
22	5 10 56.66	2.1992	25 38 43.4	0.300	22	6 56 48.19	2.1941	23 29 41.9	5.651
23	5 13 8.64	2.2002	N.25 38 57.7	0.176	23	6 58 59.80	2.1930	N.23 23 59.2	5.772
MONDAY 6.					WEDNESDAY 8.				
0	5 15 20.69	2.2012	N.25 39 4.5	+0.052	0	7 1 11.35	2.1919	N.23 18 9.3	5.892
1	5 17 32.79	2.2021	25 39 3.9	-0.072	1	7 3 22.83	2.1906	23 12 12.2	6.011
2	5 19 44.94	2.2030	25 38 55.9	0.196	2	7 5 34.24	2.1896	23 6 8.0	6.130
3	5 21 57.15	2.2039	25 38 40.4	0.321	3	7 7 45.58	2.1883	22 59 56.6	6.250
4	5 24 9.41	2.2047	25 38 17.4	0.445	4	7 9 56.84	2.1871	22 53 38.0	6.369
5	5 26 21.71	2.2053	25 37 47.0	0.569	5	7 12 8.03	2.1859	22 47 12.3	6.487
6	5 28 34.05	2.2060	25 37 9.1	0.694	6	7 14 19.15	2.1847	22 40 39.6	6.604
7	5 30 46.43	2.2066	25 36 23.7	0.819	7	7 16 30.19	2.1834	22 33 59.8	6.722
8	5 32 58.84	2.2072	25 35 30.8	0.943	8	7 18 41.15	2.1821	22 27 12.9	6.840
9	5 35 11.29	2.2077	25 34 30.5	1.067	9	7 20 52.04	2.1808	22 20 19.0	6.957
10	5 37 23.77	2.2082	25 33 22.7	1.192	10	7 23 2.85	2.1794	22 13 18.1	7.073
11	5 39 36.27	2.2086	25 32 7.4	1.318	11	7 25 13.57	2.1780	22 6 10.3	7.188
12	5 41 48.80	2.2090	25 30 44.5	1.444	12	7 27 24.21	2.1767	21 58 55.5	7.304
13	5 44 1.35	2.2093	25 29 14.1	1.569	13	7 29 34.77	2.1753	21 51 33.8	7.419
14	5 46 13.91	2.2095	25 27 36.2	1.693	14	7 31 45.25	2.1739	21 44 5.2	7.535
15	5 48 26.49	2.2097	25 25 50.9	1.818	15	7 33 55.64	2.1725	21 36 29.6	7.650
16	5 50 39.08	2.2098	25 23 58.1	1.943	16	7 36 5.95	2.1711	21 28 47.2	7.763
17	5 52 51.67	2.2099	25 21 57.7	2.069	17	7 38 16.17	2.1696	21 20 58.0	7.877
18	5 55 4.27	2.2100	25 19 49.8	2.194	18	7 40 26.30	2.1682	21 13 2.0	7.990
19	5 57 16.87	2.2100	25 17 34.4	2.319	19	7 42 36.35	2.1667	21 4 59.2	8.102
20	5 59 29.47	2.2100	25 15 11.5	2.444	20	7 44 46.31	2.1652	20 56 49.7	8.214
21	6 1 42.07	2.2100	25 12 41.1	2.569	21	7 46 56.18	2.1638	20 48 33.5	8.326
22	6 3 54.67	2.2098	25 10 3.2	2.694	22	7 49 5.97	2.1624	20 40 10.6	8.437
23	6 6 7.25	2.2096	25 7 17.8	2.819	23	7 51 15.67	2.1609	20 31 41.0	8.548
24	6 8 19.82	2.2094	N.25 4 24.9	2.944	24	7 53 25.28	2.1594	N.20 23 4.8	8.658

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 9.					SATURDAY 11.				
0	7 <sup>h</sup> 53 <sup>m</sup> 25.28 <sup>s</sup>	2.1594	N. 20° 23' 4.8"	8.658	0	9 <sup>h</sup> 35 <sup>m</sup> 37.59 <sup>s</sup>	2.1090	N. 11° 32' 8.0"	13.198
1	7 55 34.80	2.1579	20 14 22.0	8.768	1	9 37 44.12	2.1087	11 18 54.2	13.967
2	7 57 44.23	2.1565	20 5 32.7	8.877	2	9 39 50.64	2.1085	11 5 35.9	13.342
3	7 59 53.58	2.1551	19 56 36.8	8.986	3	9 41 57.14	2.1083	10 52 13.2	13.415
4	8 2 2.84	2.1536	19 47 34.4	9.093	4	9 44 3.63	2.1089	10 38 46.1	13.488
5	8 4 12.01	2.1522	19 38 25.6	9.201	5	9 46 10.12	2.1082	10 25 14.6	13.560
6	8 6 21.10	2.1507	19 29 10.3	9.308	6	9 48 16.62	2.1083	10 11 38.9	13.630
7	8 8 30.10	2.1492	19 19 48.6	9.414	7	9 50 23.12	2.1083	9 57 59.0	13.700
8	8 10 39.01	2.1478	19 10 20.6	9.520	8	9 52 29.62	2.1084	9 44 14.9	13.768
9	8 12 47.84	2.1464	19 0 46.2	9.626	9	9 54 36.13	2.1087	9 30 26.8	13.835
10	8 14 56.58	2.1450	18 51 5.5	9.730	10	9 56 42.66	2.1089	9 16 34.7	13.902
11	8 17 5.24	2.1436	18 41 18.6	9.833	11	9 58 49.20	2.1092	9 2 38.6	13.968
12	8 19 13.81	2.1422	18 31 25.5	9.937	12	10 0 55.76	2.1095	8 48 38.5	14.033
13	8 21 22.30	2.1408	18 21 26.1	10.041	13	10 3 2.34	2.1099	8 34 34.6	14.096
14	8 23 30.71	2.1394	18 11 20.6	10.143	14	10 5 8.95	2.1104	8 20 27.0	14.158
15	8 25 39.03	2.1380	18 1 9.0	10.244	15	10 7 15.59	2.1109	8 6 15.7	14.219
16	8 27 47.27	2.1367	17 50 51.3	10.345	16	10 9 22.26	2.1114	7 52 0.7	14.280
17	8 29 55.44	2.1355	17 40 27.6	10.446	17	10 11 28.96	2.1120	7 37 42.1	14.339
18	8 32 3.53	2.1342	17 29 57.8	10.546	18	10 13 35.70	2.1126	7 23 20.0	14.397
19	8 34 11.54	2.1328	17 19 22.1	10.644	19	10 15 42.49	2.1136	7 8 54.4	14.454
20	8 36 19.47	2.1316	17 8 40.5	10.743	20	10 17 49.33	2.1143	6 54 25.5	14.509
21	8 38 27.33	2.1304	16 57 53.0	10.841	21	10 19 56.21	2.1154	6 39 53.3	14.563
22	8 40 35.12	2.1292	16 46 59.6	10.937	22	10 22 3.15	2.1169	6 25 17.9	14.617
23	8 42 42.83	2.1279	N. 16° 36' 0.5"	11.033	23	10 24 10.15	2.1178	N. 6° 10' 39.2"	14.671
FRIDAY 10.					SUNDAY 12.				
0	8 44 50.47	2.1267	N. 16° 24' 55.6"	11.139	0	10 26 17.21	2.1182	N. 5° 55' 57.4"	14.722
1	8 46 58.04	2.1257	16 13 45.0	11.234	1	10 28 24.33	2.1193	5 41 12.6	14.771
2	8 49 5.55	2.1246	16 2 28.7	11.318	2	10 30 31.53	2.1206	5 26 24.9	14.819
3	8 51 12.99	2.1235	15 51 6.8	11.411	3	10 32 38.80	2.1218	5 11 34.3	14.867
4	8 53 20.37	2.1225	15 39 39.3	11.504	4	10 34 46.14	2.1231	4 56 40.9	14.913
5	8 55 27.69	2.1214	15 28 6.3	11.597	5	10 36 53.57	2.1245	4 41 44.7	14.958
6	8 57 34.94	2.1203	15 16 27.7	11.688	6	10 39 1.08	2.1259	4 26 45.9	15.002
7	8 59 42.13	2.1194	15 4 43.7	11.778	7	10 41 8.68	2.1274	4 11 44.5	15.044
8	9 1 49.27	2.1186	14 52 54.3	11.868	8	10 43 16.37	2.1290	3 56 40.6	15.085
9	9 3 56.36	2.1177	14 40 59.5	11.957	9	10 45 24.16	2.1307	3 41 34.3	15.125
10	9 6 3.39	2.1168	14 28 59.4	12.045	10	10 47 32.05	2.1324	3 26 25.6	15.164
11	9 8 10.37	2.1159	14 16 54.1	12.132	11	10 49 40.05	2.1342	3 11 14.6	15.201
12	9 10 17.30	2.1152	14 4 43.6	12.218	12	10 51 48.15	2.1369	2 56 1.5	15.236
13	9 12 24.19	2.1144	13 52 27.9	12.304	13	10 53 56.36	2.1378	2 40 46.3	15.271
14	9 14 31.03	2.1137	13 40 7.1	12.390	14	10 56 4.69	2.1399	2 25 29.0	15.304
15	9 16 37.83	2.1130	13 27 41.1	12.475	15	10 58 13.15	2.1420	2 10 9.8	15.335
16	9 18 44.59	2.1124	13 15 10.1	12.557	16	11 0 21.73	2.1441	1 54 48.8	15.366
17	9 20 51.32	2.1118	13 2 34.2	12.639	17	11 2 30.44	2.1462	1 39 25.9	15.396
18	9 22 58.01	2.1112	12 49 53.4	12.721	18	11 4 39.28	2.1485	1 24 1.3	15.423
19	9 25 4.67	2.1107	12 37 7.7	12.802	19	11 6 48.26	2.1508	1 8 35.1	15.449
20	9 27 11.30	2.1102	12 24 17.2	12.882	20	11 8 57.38	2.1532	0 53 7.4	15.473
21	9 29 17.90	2.1098	12 11 21.9	12.961	21	11 11 6.65	2.1557	0 37 38.3	15.496
22	9 31 24.48	2.1095	11 58 21.9	13.039	22	11 13 16.06	2.1582	0 22 7.9	15.517
23	9 33 31.04	2.1092	11 45 17.2	13.116	23	11 15 25.63	2.1608	N. 0° 6' 36.2"	15.538
24	9 35 37.59	2.1090	N. 11° 32' 8.0"	13.192	24	11 17 35.36	2.1635	S. 0° 8' 56.7"	15.557

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 13.					WEDNESDAY 15.				
0	<sup>h</sup> 11 <sup>m</sup> 17 <sup>s</sup> 35.36	2.1635	S. 0° 6' 56.7"	15.557	0	<sup>h</sup> 13 <sup>m</sup> 5 <sup>s</sup> 48.26	2.3691	S. 12° 25' 3.5"	14.408
1	11 19 45.25	2.1692	0 24 30.7	15.574	1	13 8 10.57	2.3747	12 39 25.9	14.337
2	11 21 55.31	2.1690	0 40 5.6	15.589	2	13 10 33.22	2.3803	12 53 43.9	14.263
3	11 24 5.53	2.1718	0 55 41.4	15.603	3	13 12 56.20	2.3859	13 7 57.5	14.188
4	11 26 15.93	2.1748	1 11 18.0	15.616	4	13 15 19.53	2.3917	13 22 6.5	14.111
5	11 28 26.51	2.1779	1 26 55.3	15.627	5	13 17 43.20	2.3974	13 36 10.8	14.039
6	11 30 37.28	2.1810	1 42 33.2	15.636	6	13 20 7.22	2.4032	13 50 10.3	13.950
7	11 32 48.23	2.1842	1 58 11.6	15.643	7	13 22 31.58	2.4089	14 4 4.8	13.866
8	11 34 59.38	2.1874	2 13 50.4	15.650	8	13 24 56.29	2.4147	14 17 54.2	13.780
9	11 37 10.72	2.1907	2 29 29.6	15.655	9	13 27 21.35	2.4206	14 31 38.4	13.692
10	11 39 22.26	2.1941	2 45 9.0	15.657	10	13 29 46.76	2.4264	14 45 17.3	13.609
11	11 41 34.01	2.1976	3 0 48.4	15.657	11	13 32 12.52	2.4323	14 58 50.7	13.510
12	11 43 45.97	2.2011	3 16 27.8	15.656	12	13 34 38.64	2.4382	15 12 18.5	13.416
13	11 45 58.14	2.2047	3 32 7.1	15.654	13	13 37 5.11	2.4441	15 25 40.6	13.319
14	11 48 10.53	2.2083	3 47 46.3	15.651	14	13 39 31.93	2.4499	15 38 56.8	13.221
15	11 50 23.13	2.2119	4 3 25.2	15.645	15	13 41 59.10	2.4558	15 52 7.1	13.121
16	11 52 35.96	2.2158	4 19 3.7	15.637	16	13 44 26.63	2.4617	16 5 11.3	13.018
17	11 54 49.02	2.2197	4 34 41.7	15.627	17	13 46 54.51	2.4677	16 18 9.3	12.913
18	11 57 2.32	2.2236	4 50 19.0	15.616	18	13 49 22.75	2.4736	16 31 0.9	12.807
19	11 59 15.85	2.2275	5 5 55.6	15.603	19	13 51 51.34	2.4794	16 43 46.1	12.698
20	12 1 29.62	2.2316	5 21 31.4	15.589	20	13 54 20.28	2.4853	16 56 24.7	12.588
21	12 3 43.64	2.2357	5 37 6.3	15.579	21	13 56 49.58	2.4912	17 8 56.7	12.477
22	12 5 57.91	2.2399	5 52 40.1	15.554	22	13 59 19.23	2.4971	17 21 21.9	12.362
23	12 8 12.43	2.2442	S. 6° 8' 12.8"	15.534	23	14 1 49.23	2.5029	S. 17° 33' 40.1"	12.245
TUESDAY 14.					THURSDAY 16.				
0	12 10 27.21	2.2485	S. 6° 23' 44.2"	15.512	0	14 4 19.58	2.5088	S. 17° 45' 51.3"	12.127
1	12 12 42.25	2.2529	6 39 14.2	15.488	1	14 6 50.28	2.5146	17 57 55.3	12.007
2	12 14 57.56	2.2573	6 54 42.8	15.463	2	14 9 21.33	2.5203	18 9 52.1	11.885
3	12 17 13.13	2.2618	7 10 9.8	15.436	3	14 11 52.72	2.5261	18 21 41.5	11.760
4	12 19 28.98	2.2664	7 25 35.1	15.406	4	14 14 24.46	2.5318	18 33 23.3	11.633
5	12 21 45.10	2.2710	7 40 58.5	15.374	5	14 16 56.54	2.5376	18 44 57.5	11.506
6	12 24 1.50	2.2757	7 56 20.0	15.342	6	14 19 28.97	2.5432	18 56 24.0	11.376
7	12 26 18.18	2.2804	8 11 39.5	15.307	7	14 22 1.73	2.5488	19 7 42.6	11.243
8	12 28 35.15	2.2853	8 26 56.8	15.269	8	14 24 34.83	2.5544	19 18 53.2	11.109
9	12 30 52.41	2.2903	8 42 11.8	15.231	9	14 27 8.26	2.5599	19 29 55.7	10.974
10	12 33 9.97	2.2951	8 57 24.5	15.190	10	14 29 42.02	2.5653	19 40 50.1	10.837
11	12 35 27.82	2.3000	9 12 34.6	15.147	11	14 32 16.10	2.5708	19 51 36.1	10.697
12	12 37 45.97	2.3051	9 27 42.1	15.102	12	14 34 50.51	2.5762	20 2 13.7	10.556
13	12 40 4.43	2.3102	9 42 46.9	15.056	13	14 37 25.24	2.5815	20 12 42.8	10.413
14	12 42 23.19	2.3152	9 57 48.8	15.007	14	14 40 0.29	2.5867	20 23 3.3	10.268
15	12 44 42.26	2.3204	10 12 47.7	14.956	15	14 42 35.65	2.5919	20 33 15.0	10.122
16	12 47 1.64	2.3257	10 27 43.5	14.903	16	14 45 11.32	2.5970	20 43 17.9	9.973
17	12 49 21.34	2.3309	10 42 36.1	14.848	17	14 47 47.29	2.6020	20 53 11.8	9.823
18	12 51 41.35	2.3363	10 57 25.3	14.792	18	14 50 23.56	2.6069	21 2 56.7	9.672
19	12 54 1.69	2.3417	11 12 11.1	14.733	19	14 53 0.12	2.6118	21 12 32.5	9.520
20	12 56 22.35	2.3470	11 26 53.3	14.673	20	14 55 36.98	2.6166	21 21 59.1	9.365
21	12 58 43.33	2.3524	11 41 31.7	14.608	21	14 58 14.12	2.6213	21 31 16.3	9.208
22	13 1 4.64	2.3579	11 56 6.3	14.543	22	15 0 51.54	2.6260	21 40 24.1	9.051
23	13 3 26.28	2.3635	12 10 36.9	14.477	23	15 3 29.24	2.6305	21 49 22.4	8.892
24	13 5 48.26	2.3691	S. 12° 25' 3.5"	14.408	24	15 6 7.20	2.6349	S. 21° 58' 11.1"	8.731

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 17.					SUNDAY 19.				
0	<sup>h</sup> 15 <sup>m</sup> 6 <sup>s</sup> 2.0	2.6349	S. 21° 58' 11.1"	8.731	0	<sup>h</sup> 17 <sup>m</sup> 15 <sup>s</sup> 14.75	2.6870	S. 25° 33' 7.1"	-0.041
1	15 8 45.43	2.6393	22 6 50.1	8.568	1	17 17 55.89	2.6842	25 33 4.0	+0.143
2	15 11 23.92	2.6435	22 15 19.3	8.405	2	17 20 36.85	2.6811	25 32 49.9	0.337
3	15 14 2.65	2.6476	22 23 38.7	8.240	3	17 23 17.62	2.6779	25 32 24.7	0.511
4	15 16 41.63	2.6517	22 31 48.1	8.074	4	17 25 58.20	2.6747	25 31 48.6	0.682
5	15 19 20.85	2.6555	22 39 47.5	7.907	5	17 28 38.59	2.6714	25 31 1.6	0.873
6	15 22 0.29	2.6593	22 47 36.9	7.738	6	17 31 18.77	2.6678	25 30 3.8	1.053
7	15 24 39.96	2.6630	22 55 16.1	7.567	7	17 33 58.73	2.6641	25 28 55.2	1.233
8	15 27 19.85	2.6666	23 2 45.0	7.396	8	17 36 38.46	2.6602	25 27 35.8	1.413
9	15 29 59.95	2.6700	23 10 3.6	7.223	9	17 39 17.96	2.6562	25 26 5.6	1.592
10	15 32 40.25	2.6733	23 17 11.8	7.050	10	17 41 57.21	2.6521	25 24 24.8	1.768
11	15 35 20.75	2.6765	23 24 9.6	6.876	11	17 44 36.21	2.6478	25 22 33.5	1.943
12	15 38 1.43	2.6795	23 30 56.9	6.700	12	17 47 14.95	2.6434	25 20 31.6	2.119
13	15 40 42.29	2.6824	23 37 33.6	6.523	13	17 49 53.42	2.6388	25 18 19.2	2.293
14	15 43 23.32	2.6852	23 43 59.7	6.346	14	17 52 31.61	2.6342	25 15 56.4	2.467
15	15 46 4.52	2.6879	23 50 15.1	6.167	15	17 55 9.52	2.6294	25 13 23.2	2.639
16	15 48 45.87	2.6903	23 56 19.8	5.987	16	17 57 47.14	2.6245	25 10 39.7	2.811
17	15 51 27.36	2.6927	24 2 13.6	5.806	17	18 0 24.46	2.6194	25 7 45.9	2.981
18	15 54 8.99	2.6949	24 7 56.5	5.624	18	18 3 1.47	2.6143	25 4 42.0	3.149
19	15 56 50.75	2.6970	24 13 28.5	5.443	19	18 5 38.17	2.6091	25 1 28.0	3.317
20	15 59 32.63	2.6989	24 18 49.7	5.262	20	18 8 14.56	2.6038	24 58 3.9	3.484
21	16 2 14.62	2.7007	24 23 59.9	5.078	21	18 10 50.62	2.5983	24 54 29.9	3.649
22	16 4 56.71	2.7022	24 28 59.1	4.891	22	18 13 26.35	2.5927	24 50 46.0	3.813
23	16 7 38.89	2.7037	S. 24° 33' 47.2"	4.709	23	18 16 1.74	2.5869	S. 24° 46' 52.3"	3.976
SATURDAY 18.					MONDAY 20.				
0	16 10 21.15	2.7050	S. 24° 38' 24.2"	4.524	0	18 18 36.78	2.5811	S. 24° 42' 48.9"	4.137
1	16 13 3.49	2.7062	24 42 50.1	4.338	1	18 21 11.47	2.5759	24 38 35.8	4.296
2	16 15 45.89	2.7071	24 47 4.8	4.153	2	18 23 45.80	2.5699	24 34 13.1	4.457
3	16 18 28.34	2.7079	24 51 8.4	3.967	3	18 26 19.77	2.5631	24 29 40.9	4.615
4	16 21 10.84	2.7086	24 55 0.8	3.780	4	18 28 53.37	2.5569	24 24 59.3	4.771
5	16 23 53.37	2.7090	24 58 42.0	3.592	5	18 31 26.60	2.5506	24 20 8.4	4.926
6	16 26 35.92	2.7093	25 2 11.9	3.405	6	18 33 59.44	2.5442	24 15 8.2	5.080
7	16 29 18.49	2.7095	25 5 30.6	3.217	7	18 36 31.90	2.5378	24 9 58.8	5.233
8	16 32 1.06	2.7095	25 8 38.0	3.030	8	18 39 3.98	2.5314	24 4 40.4	5.389
9	16 34 43.63	2.7093	25 11 34.2	2.842	9	18 41 35.67	2.5248	23 59 13.0	5.539
10	16 37 26.18	2.7090	25 14 19.1	2.654	10	18 44 6.96	2.5182	23 53 36.6	5.680
11	16 40 8.71	2.7086	25 16 52.7	2.467	11	18 46 37.85	2.5115	23 47 51.4	5.826
12	16 42 51.21	2.7079	25 19 15.1	2.279	12	18 49 8.34	2.5047	23 41 57.5	5.971
13	16 45 33.66	2.7070	25 21 26.2	2.091	13	18 51 38.42	2.4979	23 35 54.9	6.114
14	16 48 16.05	2.7060	25 23 26.0	1.903	14	18 54 8.09	2.4910	23 29 43.8	6.256
15	16 50 58.38	2.7048	25 25 14.5	1.715	15	18 56 37.24	2.4841	23 23 24.2	6.397
16	16 53 40.63	2.7035	25 26 51.8	1.528	16	18 59 6.18	2.4772	23 16 56.2	6.536
17	16 56 22.80	2.7020	25 28 17.9	1.341	17	19 1 34.60	2.4701	23 10 19.9	6.673
18	16 59 4.87	2.7002	25 29 32.7	1.153	18	19 4 2.59	2.4630	23 3 25.4	6.809
19	17 1 46.83	2.6984	25 30 36.3	0.967	19	19 6 30.16	2.4559	22 56 42.8	6.943
20	17 4 28.68	2.6965	25 31 28.7	0.781	20	19 8 57.30	2.4487	22 49 42.2	7.076
21	17 7 10.41	2.6943	25 32 10.0	0.595	21	19 11 24.01	2.4416	22 42 33.7	7.207
22	17 9 52.00	2.6920	25 32 40.1	0.409	22	19 13 50.29	2.4344	22 35 17.4	7.337
23	17 12 33.45	2.6896	25 32 59.1	0.225	23	19 16 16.14	2.4272	22 27 53.3	7.463
24	17 15 14.75	2.6870	S. 25° 33' 7.1"	-0.041	24	19 18 41.55	2.4199	S. 22° 40' 21.6"	7.591

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 21.					THURSDAY 23.				
0	<sup>h</sup> 19 <sup>m</sup> 18 <sup>s</sup> 41.55	2.4199	S. 22° 20' 21.6"	7.591	0	<sup>h</sup> 21 <sup>m</sup> 6 <sup>s</sup> 38.26	2.0002	S. 14° 19' 8.3"	11.900
1	19 21 6.53	2.4197	22 12 42.4	7.716	1	21 8 43.50	2.0044	14 7 12.6	11.956
2	19 23 31.07	2.4053	22 4 55.7	7.840	2	21 10 48.39	2.0787	13 55 13.6	12.010
3	19 25 55.17	2.3980	21 57 1.6	7.969	3	21 12 52.94	2.0731	13 43 11.4	12.063
4	19 28 18.83	2.3907	21 49 0.2	8.069	4	21 14 57.16	2.0676	13 31 6.1	12.115
5	19 30 42.05	2.3834	21 40 51.7	8.201	5	21 17 1.05	2.0620	13 18 57.6	12.167
6	19 33 4.84	2.3761	21 32 36.1	8.318	6	21 19 4.60	2.0565	13 6 46.1	12.216
7	19 35 27.19	2.3687	21 24 13.5	8.434	7	21 21 7.83	2.0519	12 54 31.7	12.264
8	19 37 49.09	2.3613	21 15 44.0	8.548	8	21 23 10.74	2.0459	12 42 14.4	12.312
9	19 40 10.55	2.3540	21 7 7.7	8.661	9	21 25 13.34	2.0407	12 29 54.3	12.358
10	19 42 31.57	2.3467	20 58 24.7	8.779	10	21 27 15.62	2.0354	12 17 31.5	12.403
11	19 44 52.15	2.3393	20 49 35.1	8.889	11	21 29 17.59	2.0303	12 5 6.0	12.447
12	19 47 12.29	2.3320	20 40 38.9	8.990	12	21 31 19.26	2.0253	11 52 37.9	12.489
13	19 49 31.99	2.3247	20 31 36.3	9.096	13	21 33 20.63	2.0203	11 40 7.3	12.531
14	19 51 51.25	2.3174	20 22 27.4	9.200	14	21 35 21.70	2.0154	11 27 34.2	12.572
15	19 54 10.08	2.3102	20 13 12.3	9.303	15	21 37 22.48	2.0107	11 14 58.7	12.611
16	19 56 28.47	2.3029	20 3 51.0	9.406	16	21 39 22.98	2.0059	11 2 20.9	12.649
17	19 58 46.43	2.2957	19 54 23.6	9.507	17	21 41 23.19	2.0012	10 49 40.8	12.686
18	20 1 3.95	2.2884	19 44 50.2	9.606	18	21 43 23.12	1.9966	10 36 58.6	12.722
19	20 3 21.04	2.2812	19 35 10.9	9.703	19	21 45 22.78	1.9921	10 24 14.2	12.757
20	20 5 37.70	2.2741	19 25 25.9	9.798	20	21 47 22.17	1.9876	10 11 27.7	12.791
21	20 7 53.93	2.2669	19 15 35.2	9.892	21	21 49 21.29	1.9832	9 58 39.3	12.823
22	20 10 9.73	2.2598	19 5 38.9	9.984	22	21 51 20.15	1.9788	9 45 48.9	12.856
23	20 12 25.10	2.2527	S. 18° 55' 37.1"	10.076	23	21 53 18.75	1.9746	S. 9° 32' 56.6"	12.887
WEDNESDAY 22.					FRIDAY 24.				
0	20 14 40.05	2.2457	S. 18° 45' 29.8"	10.166	0	21 55 17.10	1.9704	S. 9° 20' 2.5"	12.917
1	20 16 54.58	2.2387	18 35 17.2	10.254	1	21 57 15.20	1.9663	9 7 6.6	12.945
2	20 19 8.69	2.2317	18 24 59.3	10.341	2	21 59 13.06	1.9622	8 54 9.1	12.972
3	20 21 22.38	2.2247	18 14 36.3	10.426	3	22 1 10.67	1.9582	8 41 10.0	12.998
4	20 23 35.65	2.2178	18 4 8.2	10.510	4	22 3 8.05	1.9544	8 28 9.3	13.025
5	20 25 48.51	2.2109	17 53 35.1	10.592	5	22 5 5.20	1.9507	8 15 7.0	13.050
6	20 28 0.96	2.2041	17 42 57.1	10.673	6	22 7 2.13	1.9469	8 2 3.3	13.073
7	20 30 13.00	2.1973	17 32 14.3	10.753	7	22 8 58.83	1.9433	7 48 58.2	13.096
8	20 32 24.64	2.1906	17 21 26.7	10.832	8	22 10 55.32	1.9397	7 35 51.8	13.117
9	20 34 35.87	2.1838	17 10 34.5	10.908	9	22 12 51.59	1.9361	7 22 44.1	13.136
10	20 36 46.70	2.1772	16 59 37.7	10.984	10	22 14 47.65	1.9327	7 9 35.2	13.158
11	20 38 57.14	2.1707	16 48 36.4	11.058	11	22 16 43.51	1.9293	6 56 25.1	13.177
12	20 41 7.19	2.1642	16 37 30.7	11.131	12	22 18 39.16	1.9259	6 43 13.9	13.196
13	20 43 16.85	2.1577	16 26 20.7	11.202	13	22 20 34.62	1.9227	6 30 1.6	13.213
14	20 45 26.12	2.1512	16 15 6.4	11.272	14	22 22 29.89	1.9196	6 16 48.4	13.228
15	20 47 35.00	2.1449	16 3 48.0	11.340	15	22 24 24.97	1.9165	6 3 34.3	13.243
16	20 49 43.51	2.1386	15 52 25.6	11.408	16	22 26 19.87	1.9135	5 50 19.3	13.258
17	20 51 51.64	2.1323	15 40 59.1	11.474	17	22 28 14.59	1.9105	5 37 3.4	13.272
18	20 53 59.39	2.1261	15 29 28.7	11.538	18	22 30 9.13	1.9076	5 23 46.7	13.284
19	20 56 6.77	2.1200	15 17 54.5	11.602	19	22 32 3.50	1.9048	5 10 29.3	13.295
20	20 58 13.79	2.1139	15 6 16.5	11.664	20	22 33 57.71	1.9022	4 57 11.3	13.305
21	21 0 20.44	2.1078	14 54 34.8	11.725	21	22 35 51.76	1.8995	4 43 52.7	13.314
22	21 2 26.73	2.1019	14 42 49.5	11.785	22	22 37 45.65	1.8968	4 30 33.6	13.323
23	21 4 32.67	2.0961	14 31 0.6	11.843	23	22 39 39.38	1.8942	4 17 13.9	13.331
24	21 6 38.26	2.0902	S. 14° 19' 8.3"	11.900	24	22 41 32.96	1.8918	S. 4° 3' 53.8"	13.338



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 25.					MONDAY 27.				
0	<sup>h</sup> 22 <sup>m</sup> 41 <sup>s</sup> 32.96	1.8918	S. 4° 3' 53.8"	13.338	0	<sup>h</sup> 0 <sup>m</sup> 10 <sup>s</sup> 50.27	1.8533	N. 6° 28' 45.4"	12.717
1	22 43 26.40	1.8905	3 50 33.3	13.345	1	0 12 41.49	1.8541	6 41 27.5	12.685
2	22 45 19.70	1.8879	3 37 12.4	13.350	2	0 14 32.76	1.8548	6 54 7.6	12.652
3	22 47 12.86	1.8849	3 23 51.3	13.354	3	0 16 24.07	1.8556	7 6 45.8	12.619
4	22 49 5.89	1.8828	3 10 29.9	13.358	4	0 18 15.43	1.8565	7 19 21.9	12.584
5	22 50 58.80	1.8807	2 57 8.3	13.361	5	0 20 6.85	1.8575	7 31 55.9	12.549
6	22 52 51.58	1.8787	2 43 46.6	13.362	6	0 21 58.33	1.8584	7 44 27.8	12.513
7	22 54 44.24	1.8768	2 30 24.8	13.363	7	0 23 49.86	1.8594	7 56 57.5	12.477
8	22 56 36.79	1.8749	2 17 3.0	13.364	8	0 25 41.46	1.8606	8 9 25.0	12.440
9	22 58 29.23	1.8731	2 3 41.1	13.364	9	0 27 33.13	1.8617	8 21 50.3	12.402
10	23 0 21.56	1.8713	1 50 19.3	13.362	10	0 29 24.87	1.8629	8 34 13.3	12.363
11	23 2 13.79	1.8696	1 36 57.6	13.360	11	0 31 16.68	1.8642	8 46 33.9	12.323
12	23 4 5.91	1.8679	1 23 36.1	13.357	12	0 33 8.57	1.8655	8 58 52.1	12.283
13	23 5 57.94	1.8665	1 10 14.8	13.353	13	0 35 0.54	1.8668	9 11 7.9	12.242
14	23 7 49.89	1.8651	0 56 53.8	13.348	14	0 36 52.59	1.8682	9 23 21.2	12.200
15	23 9 41.75	1.8636	0 43 33.0	13.343	15	0 38 44.72	1.8696	9 35 31.9	12.157
16	23 11 33.52	1.8623	0 30 12.6	13.336	16	0 40 36.94	1.8713	9 47 40.0	12.114
17	23 13 25.22	1.8610	0 16 52.7	13.328	17	0 42 29.26	1.8727	9 59 45.6	12.071
18	23 15 16.84	1.8598	S. 0° 3' 33.2"	13.321	18	0 44 21.67	1.8742	10 11 48.5	12.025
19	23 17 8.39	1.8587	N. 0° 9' 45.8"	13.312	19	0 46 14.17	1.8759	10 23 48.6	11.979
20	23 18 59.88	1.8576	0 23 4.2	13.303	20	0 48 6.78	1.8777	10 35 46.0	11.933
21	23 20 51.30	1.8566	0 36 22.1	13.293	21	0 49 59.49	1.8794	10 47 40.6	11.887
22	23 22 42.67	1.8557	0 49 39.3	13.281	22	0 51 52.31	1.8812	10 59 32.4	11.838
23	23 24 33.98	1.8548	N. 1° 2' 55.8"	13.268	23	0 53 45.23	1.8829	N. 11° 11' 21.2"	11.789
SUNDAY 26.					TUESDAY 28.				
0	23 26 25.24	1.8540	N. 1° 16' 11.5"	13.256	0	0 55 38.26	1.8848	N. 11° 23' 7.1"	11.740
1	23 28 16.46	1.8532	1 29 26.5	13.242	1	0 57 31.41	1.8867	11 34 50.0	11.690
2	23 30 7.63	1.8525	1 42 40.6	13.228	2	0 59 24.67	1.8887	11 46 29.9	11.639
3	23 31 58.76	1.8519	1 55 53.8	13.213	3	1 1 18.05	1.8907	11 58 6.7	11.587
4	23 33 49.86	1.8514	2 9 6.1	13.198	4	1 3 11.55	1.8927	12 9 40.3	11.534
5	23 35 40.93	1.8509	2 22 17.5	13.181	5	1 5 5.18	1.8948	12 21 10.8	11.482
6	23 37 31.97	1.8505	2 35 27.8	13.163	6	1 6 58.93	1.8969	12 32 38.1	11.428
7	23 39 22.99	1.8502	2 48 37.0	13.144	7	1 8 52.81	1.8991	12 44 2.1	11.373
8	23 41 13.99	1.8498	3 1 45.1	13.126	8	1 10 46.82	1.9013	12 55 22.8	11.318
9	23 43 4.97	1.8496	3 14 52.1	13.106	9	1 12 40.97	1.9036	13 6 40.2	11.262
10	23 44 55.94	1.8494	3 27 57.8	13.085	10	1 14 35.26	1.9059	13 17 54.2	11.204
11	23 46 46.90	1.8492	3 41 2.3	13.064	11	1 16 29.68	1.9082	13 29 4.7	11.146
12	23 48 37.85	1.8492	3 54 5.5	13.042	12	1 18 24.24	1.9106	13 40 11.7	11.087
13	23 50 28.81	1.8493	4 7 7.4	13.019	13	1 20 18.95	1.9130	13 51 15.2	11.028
14	23 52 19.77	1.8493	4 20 7.8	12.995	14	1 22 13.80	1.9153	14 2 15.1	10.968
15	23 54 10.73	1.8494	4 33 6.8	12.971	15	1 24 8.79	1.9177	14 13 11.3	10.907
16	23 56 1.70	1.8497	4 46 4.3	12.946	16	1 26 3.93	1.9202	14 24 3.9	10.846
17	23 57 52.69	1.8499	4 59 0.3	12.920	17	1 27 59.22	1.9229	14 34 52.8	10.783
18	23 59 43.69	1.8502	5 11 54.7	12.893	18	1 29 54.67	1.9254	14 45 37.9	10.720
19	0 1 34.71	1.8506	5 24 47.5	12.866	19	1 31 50.27	1.9280	14 56 19.2	10.656
20	0 3 25.76	1.8511	5 37 38.6	12.837	20	1 33 46.03	1.9307	15 6 56.6	10.592
21	0 5 16.84	1.8516	5 50 28.0	12.808	21	1 35 41.95	1.9333	15 17 30.2	10.527
22	0 7 7.95	1.8521	6 3 15.6	12.778	22	1 37 38.03	1.9360	15 27 59.8	10.460
23	0 8 59.09	1.8527	6 16 1.4	12.748	23	1 39 34.27	1.9387	15 38 25.4	10.393
24	0 10 50.27	1.8533	N. 6° 28' 45.4"	12.717	24	1 41 30.67	1.9414	N. 15° 48' 47.0"	10.326

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 29.					FRIDAY 31.				
0	1 <sup>h</sup> 41 <sup>m</sup> 30.67	1.9414	N.15° 48' 47.0"	10.326	0	3 <sup>h</sup> 18 <sup>m</sup> 10.28	2.0877	N.22° 32' 21.9"	6.217
1	1 43 27.24	1.9449	15 59 4.5	10.957	1	3 20 15.63	2.0907	22 38 31.8	6.114
2	1 45 23.97	1.9489	16 9 17.9	10.189	2	3 22 21.16	2.0936	22 44 35.6	6.011
3	1 47 20.87	1.9497	16 19 27.1	10.118	3	3 24 26.86	2.0964	22 50 33.2	5.908
4	1 49 17.94	1.9537	16 29 32.1	10.047	4	3 26 32.73	2.0993	22 56 24.6	5.804
5	1 51 15.19	1.9556	16 39 32.8	9.976	5	3 28 38.77	2.1021	23 2 9.7	5.699
6	1 53 12.61	1.9594	16 49 29.2	9.904	6	3 30 44.98	2.1049	23 7 48.5	5.594
7	1 55 10.20	1.9613	16 59 21.3	9.831	7	3 32 51.36	2.1077	23 13 21.0	5.488
8	1 57 7.97	1.9643	17 9 8.9	9.757	8	3 34 57.90	2.1104	23 18 47.1	5.389
9	1 59 5.92	1.9673	17 18 52.1	9.689	9	3 37 4.61	2.1132	23 24 6.8	5.275
10	2 1 4.04	1.9702	17 28 30.8	9.607	10	3 39 11.48	2.1159	23 29 20.1	5.167
11	2 3 2.34	1.9739	17 38 4.9	9.531	11	3 41 18.51	2.1186	23 34 26.9	5.060
12	2 5 0.82	1.9769	17 47 34.5	9.455	12	3 43 25.71	2.1212	23 39 27.3	4.953
13	2 6 59.48	1.9792	17 56 59.5	9.377	13	3 45 33.06	2.1237	23 44 21.2	4.849
14	2 8 58.32	1.9823	18 6 19.8	9.298	14	3 47 40.56	2.1263	23 49 8.4	4.739
15	2 10 57.35	1.9853	18 15 35.3	9.219	15	3 49 48.22	2.1288	23 53 49.0	4.632
16	2 12 56.56	1.9884	18 24 46.1	9.140	16	3 51 56.02	2.1313	23 58 23.0	4.518
17	2 14 55.96	1.9915	18 33 52.1	9.060	17	3 54 3.97	2.1338	24 2 50.4	4.401
18	2 16 55.54	1.9946	18 42 53.3	8.979	18	3 56 12.07	2.1363	24 7 11.1	4.289
19	2 18 55.31	1.9977	18 51 49.6	8.897	19	3 58 20.31	2.1385	24 11 25.1	4.177
20	2 20 55.27	2.0008	19 0 40.9	8.814	20	4 0 28.69	2.1408	24 15 32.3	4.064
21	2 22 55.41	2.0039	19 9 27.3	8.732	21	4 2 37.21	2.1432	24 19 32.8	3.952
22	2 24 55.74	2.0071	19 18 8.7	8.648	22	4 4 45.87	2.1454	24 23 26.5	3.838
23	2 26 56.26	2.0102	N.19° 26' 45.0"	8.562	23	4 6 54.66	2.1476	N.24° 27' 13.4"	3.724
THURSDAY 30.					SATURDAY, NOVEMBER 1.				
0	2 28 56.96	2.0139	N.19° 35' 16.1"	8.476	0	4 9 3.58	2.1497	N.24° 30' 53.4"	3.610
1	2 30 57.85	2.0164	19 43 42.1	8.390	PHASES OF THE MOON.				
2	2 32 58.93	2.0197	19 52 2.9	8.303					
3	2 35 0.21	2.0239	20 0 18.5	8.216					
4	2 37 1.68	2.0280	20 8 28.8	8.127					
5	2 39 3.33	2.0291	20 16 33.8	8.038	<div>☾ Last Quarter, . . . 8<sup>d</sup> 1<sup>h</sup> 43.2<sup>m</sup></div> <div>● New Moon, . . . 15 3 9.0</div> <div>☽ First Quarter, . . . 21 18 18.9</div> <div>○ Full Moon, . . . 29 14 9.4</div>				
6	2 41 5.17	2.0322	20 24 33.4	7.948					
7	2 43 7.20	2.0354	20 32 27.6	7.858					
8	2 45 9.42	2.0386	20 40 16.3	7.767					
9	2 47 11.83	2.0417	20 47 59.6	7.675	<div>☾ Apogee, . . . . . 3<sup>d</sup> 21.3<sup>h</sup></div> <div>☾ Perigee, . . . . . 16 4.8</div> <div>☾ Apogee, . . . . . 31 8.1</div>				
10	2 49 14.43	2.0448	20 55 37.3	7.584					
11	2 51 17.21	2.0479	21 3 9.4	7.489					
12	2 53 20.18	2.0511	21 10 36.0	7.396					
13	2 55 23.34	2.0542	21 17 56.9	7.301					
14	2 57 26.69	2.0573	21 25 12.1	7.206					
15	2 59 30.22	2.0604	21 32 21.5	7.109					
16	3 1 33.94	2.0635	21 39 25.2	7.012					
17	3 3 37.84	2.0666	21 46 23.0	6.915					
18	3 5 41.93	2.0697	21 53 15.0	6.817					
19	3 7 46.20	2.0727	22 0 1.1	6.719					
20	3 9 50.65	2.0757	22 6 41.3	6.620					
21	3 11 55.29	2.0788	22 13 15.5	6.520					
22	3 14 0.11	2.0818	22 19 43.7	6.419					
23	3 16 5.11	2.0847	22 26 5.8	6.318					
24	3 18 10.28	2.0877	N.22° 32' 21.9"	6.217					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
1	Fomalhaut W.	54° 1' 45"	3694	55° 19' 53"	3608	56° 38' 19"	3593	57° 57' 1"	3589
	Jupiter W.	46 42 2	3981	48 12 38	3966	49 43 7	3999	51 13 30	3997
	α Pegasi W.	31 21 48	3580	32 40 44	3540	34 0 24	3505	35 20 43	3474
	Mars E.	38 44 16	3069	37 15 29	3079	35 46 54	3000	34 18 32	3100
	Aldebaran E.	48 45 46	3089	47 17 14	3099	45 48 55	3104	44 20 50	3115
	Pollux E.	90 32 31	3015	89 2 37	3021	87 32 50	3097	86 3 11	3033
2	Fomalhaut W.	64 33 39	3532	65 53 28	3525	67 13 24	3590	68 33 26	3515
	Jupiter W.	58 43 54	3921	60 13 41	3925	61 43 23	3999	63 13 0	3933
	α Pegasi W.	42 9 29	3379	43 32 17	3359	44 55 21	3347	46 18 38	3337
	Aldebaran E.	37 4 11	3183	35 37 42	3900	34 11 33	3918	32 45 45	3237
	Pollux E.	78 36 44	3061	77 7 47	3067	75 38 57	3079	74 10 13	3078
3	Fomalhaut W.	75 14 51	3497	76 35 19	3495	77 55 49	3493	79 16 21	3491
	Jupiter W.	70 39 53	3950	72 9 4	3953	73 38 11	3956	75 7 14	3959
	α Pegasi W.	53 17 41	3299	54 41 54	3294	56 6 13	3298	57 30 38	3293
	Saturn W.	32 41 36	3167	34 8 25	3160	35 35 22	3154	37 2 26	3149
	Pollux E.	66 48 2	3100	65 19 52	3103	63 51 46	3107	62 23 45	3110
4	Jupiter W.	82 31 55	3065	84 0 47	3066	85 29 38	3067	86 58 28	3068
	α Pegasi W.	64 34 1	3264	65 58 55	3259	67 23 54	3256	68 48 57	3252
	Saturn W.	44 19 7	3129	45 46 41	3126	47 14 19	3123	48 42 1	3119
	α Arietis W.	20 57 23	3210	22 23 20	3195	23 49 35	3182	25 16 6	3171
	Pollux E.	55 4 36	3194	53 36 56	3197	52 9 19	3199	50 41 45	3131
	Regulus E.	91 50 48	3067	90 22 23	3068	88 53 59	3068	87 25 35	3067
	Sun E.	134 27 59	3489	133 7 23	3489	131 46 47	3488	130 26 10	3487
5	Jupiter W.	94 22 52	3061	95 51 50	3059	97 20 50	3056	98 49 54	3052
	Saturn W.	56 1 34	3101	57 29 42	3096	58 57 56	3092	60 26 15	3087
	α Arietis W.	32 31 27	3129	33 58 58	3124	35 26 38	3118	36 54 26	3111
	Pollux E.	43 24 25	3139	41 57 3	3140	40 29 42	3149	39 2 23	3143
	Regulus E.	80 3 22	3069	78 34 50	3079	77 6 15	3077	75 37 37	3073
	Sun E.	123 42 36	3476	122 21 45	3479	121 0 50	3469	119 39 51	3464
6	Saturn W.	67 49 28	3059	69 18 28	3053	70 47 37	3045	72 16 51	3038
	α Arietis W.	44 15 29	3077	45 44 7	3069	47 12 55	3061	48 41 52	3059
	Mars W.	21 32 59	3196	22 59 13	3179	24 25 56	3149	25 53 6	3139
	Pollux E.	31 46 24	3157	30 19 23	3169	28 52 28	3168	27 25 40	3176
	Regulus E.	68 13 17	3052	66 44 9	3046	65 14 53	3039	63 45 29	3033
	Sun E.	112 53 38	3438	111 32 5	3431	110 10 24	3423	108 48 34	3416
7	Saturn W.	79 45 47	2994	81 16 7	2985	82 46 39	2975	84 17 23	2965
	α Arietis W.	56 9 19	3007	57 39 23	2997	59 9 40	2985	60 40 11	2975
	Mars W.	33 14 25	3046	34 43 41	3021	36 13 15	3016	37 43 8	3001
	Aldebaran W.	24 46 57	3981	26 11 31	3949	27 36 51	3906	29 2 53	3173
	Regulus E.	56 16 20	2994	54 46 0	2985	53 15 29	2976	51 44 46	2966
	Sun E.	101 57 8	3379	100 34 20	3361	99 11 19	3346	97 48 5	3336
8	α Arietis W.	68 16 19	2914	69 48 20	2901	71 20 38	2887	72 53 13	2873
	Mars W.	45 17 12	2925	46 48 59	2910	48 21 5	2894	49 53 31	2878
	Aldebaran W.	36 21 55	3042	37 51 16	3018	39 21 6	2997	40 51 23	2975
	Regulus E.	44 7 59	2912	42 35 56	2900	41 3 37	2888	39 31 3	2876
	Sun E.	90 48 31	3976	89 23 51	3969	87 58 55	3947	86 33 42	3939

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Fomalhaut W.	59 15 57	3568	60 35 6	3557	61 54 27	3548	63 13 56	3539
	Jupiter W.	52 43 47	3009	54 13 57	3006	55 44 2	3011	57 14 1	3016
	α Pegasi W.	36 41 36	3447	38 2 59	3425	39 24 47	3405	40 46 58	3387
	Mars E.	32 50 23	3111	31 22 27	3193	29 54 45	3136	28 27 19	3149
	Aldebaran E.	42 52 59	3198	41 25 23	3140	39 58 2	3154	38 30 58	3168
	Pollux E.	84 33 39	3039	83 4 14	3045	81 34 57	3051	80 5 47	3056
2	Fomalhaut W.	69 53 34	3510	71 13 47	3506	72 34 5	3503	73 54 26	3499
	Jupiter W.	64 42 32	3037	66 11 59	3041	67 41 21	3044	69 10 39	3047
	α Pegasi W.	47 42 7	3387	49 5 47	3319	50 29 37	3312	51 53 35	3305
	Aldebaran E.	31 20 20	3259	29 55 20	3299	28 30 48	3309	27 6 47	3338
	Pollux E.	72 41 36	3069	71 13 4	3067	69 44 38	3091	68 16 17	3096
3	Fomalhaut W.	80 36 55	3480	81 57 30	3469	83 18 7	3488	84 38 45	3467
	Jupiter W.	76 36 14	3061	78 5 12	3069	79 34 8	3064	81 3 2	3065
	α Pegasi W.	58 55 9	3279	60 19 45	3275	61 44 26	3271	63 9 11	3267
	Saturn W.	38 29 36	3144	39 56 52	3140	41 24 13	3137	42 51 38	3133
	Pollux E.	60 55 48	3114	59 27 55	3116	58 0 5	3119	56 32 19	3122
4	Jupiter W.	88 27 19	3066	89 56 10	3065	91 25 2	3064	92 53 56	3062
	α Pegasi W.	70 14 5	3248	71 39 17	3245	73 4 33	3241	74 29 53	3236
	Saturn W.	50 9 47	3116	51 37 37	3119	53 5 32	3109	54 33 31	3105
	α Arietis W.	26 42 50	3162	28 9 45	3153	29 36 50	3146	31 4 4	3138
	Pollux E.	49 14 13	3133	47 46 43	3134	46 19 15	3136	44 51 49	3138
	Regulus E.	85 57 10	3067	84 28 44	3067	83 0 18	3066	81 31 51	3064
	Sun E.	129 5 31	3466	127 44 51	3484	126 24 9	3481	125 3 24	3470
5	Jupiter W.	100 19 2	3049	101 48 14	3046	103 17 31	3041	104 46 53	3037
	Saturn W.	61 54 41	3062	63 23 13	3077	64 51 51	3071	66 20 36	3065
	α Arietis W.	38 22 22	3165	39 50 26	3097	41 18 39	3091	42 47 0	3084
	Pollux E.	37 35 6	3145	36 7 51	3148	34 40 39	3150	33 13 30	3153
	Regulus E.	74 8 55	3069	72 40 8	3065	71 11 16	3061	69 42 19	3067
	Sun E.	118 18 47	3460	116 57 38	3455	115 36 24	3450	114 15 4	3445
6	Saturn W.	73 46 20	3030	75 15 56	3022	76 45 42	3013	78 15 39	3004
	α Arietis W.	50 11 0	3044	51 40 18	3035	53 9 47	3026	54 39 27	3017
	Mars W.	27 20 40	3119	28 48 35	3095	30 16 51	3078	31 45 28	3061
	Pollux E.	25 59 2	3186	24 32 36	3198	23 6 25	3215	21 40 34	3237
	Regulus E.	62 15 57	3086	60 46 17	3019	59 16 28	3011	57 46 29	3003
	Sun E.	107 26 36	3408	106 4 29	3400	104 42 12	3391	103 19 45	3382
7	Saturn W.	85 48 20	2954	87 19 31	2943	88 50 56	2931	90 22 36	2919
	α Arietis W.	62 10 55	2964	63 41 53	2959	65 13 6	2940	66 44 34	2927
	Mars W.	39 13 19	2986	40 43 49	2971	42 14 38	2957	43 45 45	2941
	Aldebaran W.	30 29 34	3143	31 56 51	3116	33 24 41	3090	34 53 3	3065
	Regulus E.	50 13 51	2956	48 42 43	2946	47 11 22	2935	45 39 48	2924
	Sun E.	96 24 38	3327	95 0 58	3315	93 37 4	3302	92 12 55	3299
8	α Arietis W.	74 26 6	2850	75 59 18	2844	77 32 49	2839	79 6 39	2814
	Mars W.	51 26 18	2969	52 59 26	2945	54 32 55	2926	56 6 46	2911
	Aldebaran W.	42 22 7	2954	43 53 17	2933	45 24 54	2919	46 56 57	2903
	Regulus E.	37 58 13	2963	36 25 7	2950	34 51 44	2938	33 18 5	2925
	Sun E.	85 8 11	3217	83 42 22	3202	82 16 15	3186	80 49 49	3169

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
9	Mars W.	57 40 59	2794	59 15 35	2777	60 50 33	2759	62 25 55	2741
	Aldebaran W.	48 29 25	2873	50 2 19	2859	51 35 39	2839	53 9 25	2819
	Regulus E.	31 44 9	2819	30 9 57	2799	28 35 28	2786	27 0 42	2774
	Sun E.	79 23 3	3153	77 55 57	3136	76 28 31	3119	75 0 44	3101
10	Mars W.	70 28 44	2849	72 6 32	2830	73 44 46	2810	75 23 27	2801
	Aldebaran W.	61 4 45	2713	62 41 8	2693	64 17 57	2673	65 55 13	2653
	Pollux W.	19 28 8	2911	21 0 13	2855	22 33 29	2808	24 7 46	2766
	Sun E.	67 36 19	3009	66 6 17	2990	64 35 52	2971	63 5 3	2959
11	Mars W.	82 43 31	2494	85 24 53	2475	87 6 42	2455	88 48 58	2436
	Aldebaran W.	74 8 19	2553	75 48 18	2534	77 28 44	2515	79 9 37	2495
	Pollux W.	32 11 41	2901	33 50 35	2873	35 30 7	2847	37 10 15	2829
	Sun E.	55 24 52	2855	53 51 35	2836	52 17 54	2817	50 43 48	2798
12	Aldebaran W.	87 40 46	2401	89 24 20	2389	91 8 20	2365	92 52 45	2348
	Pollux W.	45 39 24	2406	47 22 50	2385	49 6 46	2364	50 51 12	2345
	Sun E.	42 47 10	2707	41 10 39	2690	39 33 46	2674	37 56 31	2658
17	Sun W.	26 47 37	2400	28 31 12	2397	30 14 51	2396	31 58 31	2396
	α Aquilæ E.	74 47 1	2998	73 8 44	2946	71 30 52	2906	69 53 27	2868
	Jupiter E.	102 42 42	2927	100 49 50	2933	98 57 7	2940	97 4 35	2947
18	Sun W.	40 35 34	2427	42 18 31	2436	44 1 15	2445	45 43 46	2455
	α Aquilæ E.	61 54 50	2938	60 21 11	2976	58 48 22	2919	57 16 27	2865
	Jupiter E.	87 44 55	2990	85 53 41	2101	84 2 44	2113	82 12 4	2194
19	Sun W.	54 12 24	2516	55 58 15	2530	57 33 47	2544	59 13 59	2559
	α Aquilæ E.	49 52 52	2992	48 27 56	2938	47 4 28	2492	45 42 36	2514
	Fomalhaut E.	72 34 28	2640	70 56 23	2664	69 18 55	2689	67 42 1	2716
	Jupiter E.	73 3 23	2188	71 14 38	2202	69 26 14	2217	67 38 12	2233
	α Pegasi F.	92 37 44	2231	90 52 30	2245	89 7 36	2259	87 23 2	2273
20	Sun W.	67 29 54	2635	69 8 1	2651	70 45 47	2667	72 23 11	2684
	Antares W.	26 18 12	2302	28 4 8	2317	29 49 43	2332	31 34 56	2346
	Jupiter E.	58 43 41	2310	56 57 56	2306	55 12 34	2292	53 27 36	2279
	Fomalhaut E.	59 47 7	2676	58 14 17	2614	56 42 16	2564	55 11 5	2507
	α Pegasi E.	78 45 41	2454	77 3 23	2471	75 21 29	2489	73 40 0	2507
21	Sun W.	80 24 43	2786	81 59 56	2782	83 34 47	2798	85 9 17	2815
	Antares W.	40 15 34	2493	41 58 36	2438	43 41 16	2424	45 23 34	2409
	Jupiter E.	44 48 50	2445	43 6 19	2402	41 24 12	2480	39 42 30	2498
	Fomalhaut E.	47 49 39	2259	46 24 39	2294	45 0 55	2394	43 38 32	2471
	α Pegasi E.	65 19 11	2605	63 40 23	2626	62 2 4	2648	60 24 14	2670
	Saturn E.	83 0 11	2437	81 17 29	2454	79 35 11	2470	77 53 15	2485
22	Sun W.	92 56 29	2996	94 28 53	2912	96 0 57	2927	97 32 42	2942
	Antares W.	53 49 51	2543	55 30 4	2557	57 9 58	2572	58 49 32	2586
	α Pegasi E.	52 22 42	2791	50 48 2	2817	49 13 56	2844	47 40 25	2873
	Saturn E.	69 29 2	2564	67 49 17	2579	66 9 53	2594	64 30 50	2610
	α Arietis E.	94 4 16	2559	92 24 25	2574	90 44 54	2588	89 5 42	2601
23	Sun W.	105 6 40	3017	106 36 32	3031	108 6 6	3045	109 35 23	3059

GREENWICH MEAN TIME.										
LUNAR DISTANCES.										
Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
9	Mars	W.	64° 1' 40"	9793	65° 37' 49"	9705	67° 14' 28"	9687	68° 51' 21"	9688
	Aldebaran	W.	54 43 37	9799	56 18 15	9779	57 53 19	9753	59 28 49	9733
	Regulus	E.	25 25 40	9763	23 50 24	9759	22 14 53	9743	20 39 10	9735
	Sun	E.	73 32 36	3063	72 4 6	3065	70 35 13	3047	69 5 58	3027
10	Mars	W.	77 2 35	9579	78 42 9	9553	80 22 9	9533	82 2 36	9513
	Aldebaran	W.	67 32 56	9633	69 11 6	9613	70 49 43	9593	72 28 47	9573
	Pollux	W.	25 42 59	9797	27 19 3	9699	28 55 53	9680	30 33 26	9660
	Sun	E.	61 33 50	2933	60 2 13	2913	58 30 11	2894	56 57 44	2874
11	Mars	W.	90 31 42	9417	92 14 53	9398	93 58 31	9378	95 42 37	9359
	Aldebaran	W.	80 50 57	9476	82 32 44	9457	84 14 58	9438	85 57 39	9419
	Pollux	W.	38 50 58	9497	40 32 15	9473	42 14 6	9450	43 56 29	9436
	Sun	E.	49 9 17	9779	47 34 22	9760	45 59 2	9749	44 23 18	9734
12	Aldebaran	W.	94 37 35	9330	96 22 51	9313	98 8 31	9296	99 54 34	9286
	Pollux	W.	52 36 6	9385	54 21 29	9306	56 7 20	9287	57 53 38	9269
	Sun	E.	36 18 55	2643	34 40 59	2629	33 2 44	2616	31 24 11	2604
17	Sun	W.	33 42 9	9401	35 25 42	9406	37 9 8	9419	38 52 26	9419
	α Aquilæ	E.	68 16 31	9713	66 40 8	9741	65 4 22	9770	63 29 15	9802
	Jupiter	E.	95 12 14	9054	93 20 4	9063	91 28 7	9079	89 36 24	9061
18	Sun	W.	47 26 2	9466	49 8 3	9478	50 49 47	9490	52 31 14	9509
	α Aquilæ	E.	55 45 30	3014	54 15 35	3069	52 46 47	3198	51 19 11	3198
	Jupiter	E.	80 21 42	9136	78 31 38	9149	76 41 53	9169	74 52 28	9175
19	Sun	W.	60 53 51	9573	62 33 23	9586	64 12 35	9604	65 51 25	9619
	α Aquilæ	E.	44 22 27	3615	43 4 9	3797	41 47 50	3850	40 33 39	3866
	Fomalhaut	E.	66 5 43	9746	64 30 3	9775	62 55 2	9807	61 20 43	9840
	Jupiter	E.	65 50 33	9247	64 3 16	9269	62 16 21	9278	60 29 49	9294
	α Pegasi	E.	85 38 49	2369	83 54 58	2404	82 11 29	2480	80 28 23	2437
20	Sun	W.	74 0 13	9700	75 36 53	9716	77 13 11	9739	78 49 8	9749
	Antares	W.	33 19 48	9369	35 4 18	9378	36 48 25	9393	38 32 10	9408
	Jupiter	E.	51 43 2	9375	49 58 52	9393	48 15 7	9410	46 31 46	9437
	Fomalhaut	E.	53 40 48	3043	52 11 28	3091	50 43 7	3143	49 15 50	3198
	α Pegasi	E.	71 58 57	2586	70 18 20	2645	68 38 10	2665	66 58 27	2685
21	Sun	W.	86 43 25	9639	88 17 12	9648	89 50 38	9663	91 23 44	9680
	Antares	W.	47 5 31	2484	48 47 7	2490	50 28 22	2513	52 9 17	2528
	Jupiter	E.	38 1 14	2616	36 20 23	2635	34 39 58	2654	33 0 0	2674
	Fomalhaut	E.	42 17 35	3555	40 58 11	3646	39 40 26	3746	38 24 27	3856
	α Pegasi	E.	58 46 54	9692	57 10 4	9715	55 33 44	9739	53 57 56	9765
	Saturn	E.	76 11 41	2601	74 30 29	2616	72 49 38	2639	71 9 9	2648
22	Sun	W.	99 4 8	9858	100 35 14	9873	102 6 1	9887	103 36 30	9909
	Antares	W.	60 28 46	2600	62 7 41	2613	63 46 18	2626	65 24 37	2640
	α Pegasi	E.	46 7 31	2908	44 35 16	2935	43 3 42	2960	41 32 51	2987
	Saturn	E.	62 52 8	2625	61 13 47	2640	59 35 47	2656	57 58 8	2671
	α Arietis	E.	87 26 49	2616	85 48 16	2630	84 10 2	2643	82 32 6	2657
23	Sun	W.	111 4 23	3079	112 33 7	3066	114 1 34	3100	115 29 44	3113

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	Antares W.	67° 2' 37"	2654	68° 40' 19"	2666	70° 17' 44"	2679	71° 54' 52"	2693
	Saturn E.	56 20 49	2686	54 43 51	2701	53 7 13	2717	51 30 56	2732
	α Arietis E.	80 54 28	2670	79 17 8	2684	77 40 6	2696	76 3 21	2710
	Mars E.	101 55 36	2689	100 16 26	2601	98 37 32	2619	96 58 54	2634
24	Sun W.	116 57 38	3125	118 25 17	3138	119 52 41	3150	121 19 50	3162
	Antares W.	79 56 27	2750	81 32 0	2762	83 7 18	2779	84 42 22	2794
	α Aquilæ W.	37 3 29	4758	38 3 40	4636	39 5 42	4511	40 9 24	4409
	Saturn E.	43 34 38	2811	42 0 25	2828	40 26 33	2845	38 53 3	2862
	α Arietis E.	68 3 48	2770	66 28 41	2782	64 53 49	2793	63 19 12	2805
	Mars E.	88 49 32	2679	87 12 24	2689	85 35 30	2699	83 58 49	2709
	Aldebaran E.	100 38 1	2602	99 3 36	2613	97 29 25	2624	95 55 28	2634
25	α Aquilæ W.	45 48 5	4043	46 59 3	3900	48 10 52	3845	49 23 26	3804
	α Arietis E.	55 29 43	2859	53 56 31	2869	52 23 32	2879	50 50 46	2889
	Mars E.	75 58 38	2756	74 23 12	2765	72 47 58	2773	71 12 55	2782
	Aldebaran E.	88 8 57	2683	86 36 16	2692	85 3 47	2702	83 31 31	2712
26	α Aquilæ W.	55 35 34	3750	56 51 28	3728	58 7 45	3709	59 24 23	3691
	α Arietis E.	43 10 7	2939	41 38 37	2949	40 7 20	2959	38 36 16	2969
	Mars E.	63 20 20	2691	61 46 19	2698	60 12 28	2635	58 38 46	2643
	Aldebaran E.	75 52 58	2954	74 21 48	2962	72 50 48	2971	71 19 59	2979
27	α Aquilæ W.	65 51 42	3635	67 9 49	3617	68 28 5	3610	69 46 29	3602
	Fomalhaut W.	41 25 9	4007	42 36 42	3953	43 49 8	3906	45 2 22	3863
	Jupiter W.	32 46 43	3003	34 16 52	3005	35 46 58	3008	37 17 1	3011
	Mars E.	50 52 32	2676	49 19 43	2683	47 47 3	2690	46 14 31	2696
	Aldebaran E.	63 48 23	3018	62 18 33	3026	60 48 53	3034	59 19 23	3042
28	α Aquilæ W.	76 20 3	3581	77 38 58	3578	78 57 56	3577	80 16 55	3577
	Fomalhaut W.	51 18 8	3705	52 34 50	3682	53 51 56	3661	55 9 25	3642
	Jupiter W.	44 46 16	3097	46 15 55	3031	47 45 29	3035	49 14 59	3039
	α Pegasi W.	28 37 12	3707	29 53 52	3648	31 11 34	3598	32 30 10	3556
	Mars E.	38 33 54	2698	37 2 11	2635	35 30 37	2643	33 59 13	2651
	Aldebaran E.	51 54 17	3082	50 25 45	3091	48 57 24	3100	47 29 14	3109
29	Fomalhaut W.	61 41 18	3573	63 0 23	3561	64 19 40	3551	65 39 8	3543
	Jupiter W.	56 41 26	3054	58 10 32	3057	59 39 34	3061	61 8 32	3064
	α Pegasi W.	39 12 58	3414	40 34 59	3395	41 57 21	3378	43 20 2	3363
	Aldebaran E.	40 11 14	3159	38 44 16	3171	37 17 32	3184	35 51 4	3196
	Pollux E.	81 49 13	3085	80 20 21	3089	78 51 33	3073	77 22 50	3076
30	Fomalhaut W.	72 18 30	3511	73 38 42	3507	74 58 58	3503	76 19 19	3500
	Jupiter W.	68 32 31	3077	70 1 9	3078	71 29 45	3080	72 58 19	3083
	α Pegasi W.	50 17 14	3309	51 41 15	3301	53 5 25	3294	54 29 43	3288
	Saturn W.	31 31 6	3173	32 57 47	3166	34 24 37	3158	35 51 36	3152
	Pollux E.	70 0 20	3083	68 32 2	3096	67 3 48	3100	65 35 38	3103
31	Fomalhaut W.	83 1 48	3489	84 22 24	3488	85 43 1	3488	87 3 39	3487
	Jupiter W.	80 20 33	3091	81 48 54	3092	83 17 14	3092	84 45 33	3093
	α Pegasi W.	61 32 56	3263	62 57 51	3259	64 22 51	3255	65 47 55	3252
	Saturn W.	43 8 8	3130	44 35 41	3127	46 3 18	3124	47 30 58	3122
	Pollux E.	58 15 42	3117	56 47 53	3119	55 20 7	3122	53 52 24	3124

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	Antares W.	73 31 43	9704	75 8 17	9716	76 44 36	9798	78 20 39	9739
	Saturn E.	49 54 59	9748	48 19 23	9763	46 44 7	9779	45 9 12	9795
	α Arietis E.	74 26 54	9798	72 50 44	9735	71 14 50	9746	69 39 11	9756
	Mars E.	95 20 31	9635	93 42 24	9646	92 4 32	9657	90 26 55	9668
24	Sun W.	122 46 44	3174	124 13 24	3186	125 39 50	3198	127 6 2	3209
	Antares W.	86 17 11	9794	87 51 47	9804	89 26 10	9814	91 0 20	9823
	α Aquilæ W.	41 14 37	4318	42 21 13	4327	43 29 4	4105	44 38 3	4100
	Saturn E.	37 19 56	9880	35 47 12	9900	34 14 53	9900	32 42 59	9941
	α Arietis E.	61 44 50	9815	60 10 42	9827	58 36 49	9837	57 3 9	9848
	Mars E.	82 22 21	9719	80 46 6	9739	79 10 4	9738	77 34 15	9747
	Aldebaran E.	94 21 44	9844	92 48 13	9854	91 14 55	9864	89 41 50	9873
25	α Aquilæ W.	50 36 42	3968	51 50 36	3939	53 5 5	3909	54 20 5	3774
	α Arietis E.	49 18 13	9899	47 45 53	9909	46 13 45	9919	44 41 50	9928
	Mars E.	69 38 3	9789	68 3 21	9798	66 28 50	9808	64 54 30	9814
	Aldebaran E.	81 59 27	9920	80 27 34	9928	78 55 51	9937	77 24 19	9946
26	α Aquilæ W.	60 41 20	3675	61 58 34	3661	63 16 3	3648	64 33 46	3635
	α Arietis E.	37 5 24	9979	35 34 45	9990	34 4 20	3001	32 34 9	3013
	Mars E.	57 5 14	9850	55 31 51	9856	53 58 36	9863	52 25 30	9869
	Aldebaran E.	69 49 20	9987	68 18 51	9995	66 48 32	3003	65 18 23	3010
27	α Aquilæ W.	71 5 1	3597	72 23 39	3591	73 42 23	3587	75 1 11	3584
	Fomalhaut W.	46 16 19	3894	47 30 56	3790	48 46 8	3759	50 1 53	3738
	Jupiter W.	38 47 0	3014	40 16 55	3018	41 46 46	3021	43 16 33	3024
	Mars E.	44 42 7	9908	43 9 51	9909	41 37 44	9916	40 5 45	9922
	Aldebaran E.	57 50 2	3050	56 20 51	3058	54 51 50	3066	53 22 59	3073
28	α Aquilæ W.	81 35 54	3578	82 54 54	3577	84 13 53	3578	85 32 51	3580
	Fomalhaut W.	56 27 14	3894	57 45 22	3810	59 3 46	3598	60 22 25	3593
	Jupiter W.	50 44 24	3049	52 13 45	3045	53 43 2	3048	55 12 16	3051
	α Pegasi W.	33 49 32	3520	35 9 34	3488	36 30 12	3480	37 51 21	3435
	Mars E.	32 27 59	9958	30 56 54	9968	29 25 59	9975	27 55 15	9988
	Aldebaran E.	46 1 15	3118	44 33 27	3127	43 5 50	3138	41 38 26	3148
29	Fomalhaut W.	66 58 45	3535	68 18 30	3588	69 38 23	3589	70 58 23	3516
	Jupiter W.	62 37 26	3088	64 6 17	3089	65 35 5	3071	67 3 50	3074
	α Pegasi W.	44 43 1	3350	46 6 15	3338	47 29 43	3327	48 53 23	3316
	Aldebaran E.	34 24 53	3214	32 59 0	3231	31 33 27	3249	30 8 16	3271
	Pollux E.	75 54 11	3079	74 25 36	3083	72 57 6	3087	71 28 41	3091
30	Fomalhaut W.	77 39 43	3497	79 0 10	3495	80 20 40	3499	81 41 13	3499
	Jupiter W.	74 26 50	3085	75 55 18	3088	77 23 45	3087	78 52 10	3089
	α Pegasi W.	55 54 9	3392	57 18 42	3376	58 43 21	3371	60 8 6	3367
	Saturn W.	37 18 43	3147	38 45 56	3142	40 13 15	3138	41 40 39	3134
	Pollux E.	64 7 32	3105	62 39 29	3109	61 11 30	3111	59 43 34	3114
31	Fomalhaut W.	88 24 18	3487	89 44 57	3488	91 5 35	3489	92 26 12	3488
	Jupiter W.	86 13 51	3094	87 42 8	3094	89 10 25	3094	90 38 42	3094
	α Pegasi W.	67 13 3	3348	68 38 15	3344	70 3 32	3341	71 28 52	3338
	Saturn W.	48 58 41	3119	50 26 27	3116	51 54 17	3114	53 22 10	3111
	Pollux E.	52 24 44	3127	50 57 7	3129	49 29 33	3128	48 2 2	3125



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
Sat.	1	<sup>h</sup> 14 <sup>m</sup> 25 <sup>s</sup> 15.75	9.790	S. 14° 24' 39.9"	-48.16	16' 9.80	66.93	<sup>m</sup> 16 18.06	0.066
Sun.	2	14 29 11.13	9.825	14 43 48.9	47.58	16 10.04	67.05	16 19.25	0.032
Mon.	3	14 33 7.32	9.859	15 2 43.7	46.98	16 10.28	67.16	16 19.62	0.002
Tues.	4	14 37 4.34	9.894	15 21 23.7	46.36	16 10.52	67.28	16 19.15	0.037
Wed.	5	14 41 2.21	9.929	15 39 48.8	45.72	16 10.76	67.39	16 17.85	0.072
Thur.	6	14 45 0.92	9.964	15 57 58.4	45.07	16 10.99	67.51	16 15.69	0.108
Frid.	7	14 49 0.50	10.000	16 15 52.0	44.40	16 11.22	67.63	16 12.68	0.144
Sat.	8	14 53 0.94	10.036	16 33 29.4	43.71	16 11.45	67.75	16 8.80	0.180
Sun.	9	14 57 2.25	10.072	16 50 50.0	43.00	16 11.68	67.87	16 4.07	0.216
Mon.	10	15 1 4.41	10.108	17 7 53.6	42.28	16 11.90	67.99	15 58.47	0.252
Tues.	11	15 5 7.44	10.144	17 24 39.7	41.55	16 12.12	68.11	15 52.01	0.288
Wed.	12	15 9 11.34	10.181	17 41 7.7	40.78	16 12.34	68.23	15 44.69	0.323
Thur.	13	15 13 16.11	10.217	17 57 17.3	40.00	16 12.56	68.35	15 36.50	0.359
Frid.	14	15 17 21.71	10.252	18 13 8.0	39.19	16 12.77	68.47	15 27.48	0.394
Sat.	15	15 21 28.17	10.287	18 28 39.6	38.38	16 12.99	68.59	15 17.61	0.429
Sun.	16	15 25 35.46	10.321	18 43 51.6	37.56	16 13.20	68.71	15 6.90	0.464
Mon.	17	15 29 43.59	10.356	18 58 43.6	36.72	16 13.41	68.83	14 55.36	0.499
Tues.	18	15 33 52.55	10.390	19 13 15.2	35.86	16 13.62	68.94	14 42.99	0.533
Wed.	19	15 38 2.33	10.424	19 27 25.9	35.00	16 13.83	69.06	14 29.81	0.567
Thur.	20	15 42 12.93	10.457	19 41 15.5	34.11	16 14.03	69.17	14 15.82	0.600
Frid.	21	15 46 24.32	10.490	19 54 43.6	33.21	16 14.23	69.28	14 1.02	0.633
Sat.	22	15 50 36.50	10.522	20 7 49.9	32.30	16 14.42	69.39	13 45.44	0.665
Sun.	23	15 54 49.43	10.554	20 20 34.0	31.36	16 14.61	69.50	13 29.11	0.697
Mon.	24	15 59 3.12	10.585	20 32 55.6	30.41	16 14.80	69.61	13 12.02	0.728
Tues.	25	16 3 17.59	10.617	20 44 54.2	29.45	16 14.98	69.71	12 54.16	0.759
Wed.	26	16 7 32.79	10.648	20 56 29.5	28.48	16 15.16	69.81	12 35.57	0.790
Thur.	27	16 11 48.71	10.678	21 7 41.3	27.49	16 15.33	69.91	12 16.26	0.820
Frid.	28	16 16 5.35	10.707	21 18 29.3	26.49	16 15.50	70.01	11 56.23	0.849
Sat.	29	16 20 22.69	10.736	21 28 53.2	25.48	16 15.66	70.11	11 35.50	0.878
Sun.	30	16 24 40.72	10.765	21 38 52.7	24.45	16 15.81	70.20	11 14.09	0.906
Mon.	31	16 28 59.43	10.793	S. 21° 48' 27.3"	-23.41	16 15.96	70.29	10 52.00	0.934

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.15 from the Sidereal Time.

— prefixed to the hourly change of declination indicates that south declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	S. <sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Sat.	1	14 25 18.41	9.791	S. 14 24 53.0	48.16	16 18.10	0.066	14 41 36.51
Sun.	2	14 29 13.80	9.825	14 44 1.8	47.57	16 19.26	0.032	14 45 33.06
Mon.	3	14 33 10.00	9.859	15 2 56.4	46.97	16 19.62	0.002	14 49 29.62
Tues.	4	14 37 7.03	9.894	15 21 36.3	46.35	16 19.14	0.037	14 53 26.17
Wed.	5	14 41 4.90	9.929	15 40 1.1	45.71	16 17.83	0.072	14 57 22.73
Thur.	6	14 45 3.62	9.964	15 58 10.5	45.08	16 15.66	0.108	15 1 19.28
Frid.	7	14 49 3.20	10.000	16 16 4.9	44.39	16 12.64	0.144	15 5 15.84
Sat.	8	14 53 3.64	10.036	16 33 41.1	43.70	16 8.75	0.180	15 9 12.39
Sun.	9	14 57 4.94	10.072	16 51 1.5	42.99	16 4.01	0.216	15 13 8.95
Mon.	10	15 1 7.10	10.108	17 8 4.9	42.27	15 58.40	0.252	15 17 5.50
Tues.	11	15 5 10.12	10.144	17 24 50.6	41.54	15 51.93	0.288	15 21 2.06
Wed.	12	15 9 14.01	10.180	17 41 18.4	40.77	15 44.60	0.323	15 24 58.61
Thur.	13	15 13 18.76	10.216	17 57 27.6	39.99	15 36.41	0.359	15 28 55.17
Frid.	14	15 17 24.35	10.251	18 13 18.0	39.20	15 27.38	0.394	15 32 51.73
Sat.	15	15 21 30.79	10.286	18 28 49.3	38.39	15 17.50	0.429	15 36 48.29
Sun.	16	15 25 38.06	10.320	18 44 0.9	37.57	15 6.78	0.464	15 40 44.84
Mon.	17	15 29 46.16	10.355	18 58 52.6	36.73	14 55.24	0.499	15 44 41.40
Tues.	18	15 33 55.09	10.389	19 13 23.9	35.87	14 42.86	0.533	15 48 37.95
Wed.	19	15 38 4.84	10.423	19 27 34.3	34.99	14 29.67	0.567	15 52 34.51
Thur.	20	15 42 15.40	10.456	19 41 23.6	34.10	14 15.67	0.600	15 56 31.07
Frid.	21	15 46 26.76	10.489	19 54 51.3	33.20	14 0.87	0.633	16 0 27.63
Sat.	22	15 50 38.90	10.521	20 7 57.3	32.29	13 45.28	0.665	16 4 24.18
Sun.	23	15 54 51.79	10.553	20 20 41.0	31.35	13 28.95	0.697	16 8 20.74
Mon.	24	15 59 5.44	10.584	20 33 2.2	30.40	13 11.85	0.728	16 12 17.29
Tues.	25	16 3 19.86	10.615	20 45 0.4	29.44	12 53.99	0.759	16 16 13.85
Wed.	26	16 7 35.01	10.646	20 56 35.4	28.47	12 35.40	0.790	16 20 10.41
Thur.	27	16 11 50.83	10.676	21 7 46.9	27.48	12 16.09	0.820	16 24 6.97
Frid.	28	16 16 7.46	10.705	21 18 34.6	26.48	11 56.06	0.849	16 28 3.52
Sat.	29	16 20 24.75	10.734	21 28 58.1	25.47	11 35.33	0.878	16 32 0.08
Sun.	30	16 24 42.72	10.763	21 38 57.2	24.44	11 13.92	0.906	16 35 56.64
Mon.	31	16 29 1.37	10.791	S. 21 48 31.5	23.40	10 51.83	0.934	16 39 53.20

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

— prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 hour.  
+ 9".8565  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal 0 <sup>h</sup> .
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	305	218° 43' 7.0	42' 10.0	150.17	+0.78	9.9964932	-46.0	9 <sup>h</sup> 16 <sup>m</sup> 52.01 <sup>s</sup>	
2	306	219 43 12.0	42 14.9	150.25	0.68	.9963835	45.3	9 12 56.10	
3	307	220 43 19.1	42 21.9	150.33	0.55	.9962753	44.7	9 9 0.20	
4	308	221 43 28.3	42 31.0	150.42	0.41	.9961686	44.1	9 5 4.29	
5	309	222 43 39.6	42 42.1	150.51	0.27	.9960632	43.5	9 1 8.38	
6	310	223 43 53.0	42 55.3	150.60	0.14	.9959592	43.0	8 57 12.47	
7	311	224 44 8.4	43 10.6	150.69	+0.03	.9958565	42.5	8 53 16.56	
8	312	225 44 25.9	43 28.0	150.77	-0.08	.9957547	42.1	8 49 20.65	
9	313	226 44 45.4	43 47.4	150.85	0.14	.9956538	41.7	8 45 24.74	
10	314	227 45 6.9	44 8.7	150.92	0.19	.9955540	41.3	8 41 28.83	
11	315	228 45 30.2	44 31.8	151.00	0.21	.9954551	41.0	8 37 32.92	
12	316	229 45 55.3	44 56.8	151.08	0.19	.9953571	40.6	8 33 37.01	
13	317	230 46 22.1	45 23.5	151.15	0.13	.9952598	40.3	8 29 41.10	
14	318	231 46 50.6	45 51.8	151.22	-0.07	.9951633	40.0	8 25 45.19	
15	319	232 47 20.8	46 21.8	151.29	+0.03	.9950676	39.7	8 21 49.28	
16	320	233 47 52.5	46 53.3	151.35	0.13	.9949728	39.3	8 17 53.37	
17	321	234 48 25.4	47 26.2	151.41	0.26	.9948789	38.9	8 13 57.46	
18	322	235 48 59.9	48 0.5	151.46	0.39	.9947861	38.4	8 10 1.55	
19	323	236 49 35.6	48 36.0	151.50	0.53	.9946946	37.9	8 6 5.64	
20	324	237 50 12.4	49 12.6	151.54	0.64	.9946044	37.3	8 2 9.73	
21	325	238 50 50.4	49 50.4	151.59	0.74	.9945157	36.6	7 58 13.82	
22	326	239 51 29.6	50 29.5	151.65	0.83	.9944285	35.9	7 54 17.91	
23	327	240 52 9.9	51 9.7	151.70	0.89	.9943431	35.1	7 50 22.00	
24	328	241 52 51.2	51 50.8	151.74	0.91	.9942594	34.3	7 46 26.09	
25	329	242 53 33.6	52 33.0	151.79	0.91	.9941784	33.4	7 42 30.18	
26	330	243 54 17.2	53 16.4	151.84	0.87	.9940993	32.4	7 38 34.27	
27	331	244 55 2.0	54 1.1	151.89	0.81	.9940225	31.4	7 34 38.35	
28	332	245 55 47.9	54 46.9	151.94	0.73	.9939481	30.4	7 30 42.44	
29	333	246 56 35.1	55 33.9	151.99	0.61	.9938761	29.5	7 26 46.53	
30	334	247 57 23.4	56 22.0	152.04	0.49	.9938067	28.5	7 22 50.62	
31	335	248 58 13.0	57 11.4	152.09	+0.35	9.9937396	-27.5	7 18 54.70	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>d</sup> .0.									Diff. for 1 hour. — 9 <sup>s</sup> .8996 (Table II.)

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>d</sup>	
1	14 44.4	14 45.1	53 58.8	+0.16	54 1.6	+0.30	13 55.3	2.08	16.9	
2	14 46.4	14 48.0	54 6.1	0.44	54 12.3	0.59	14 45.5	2.10	17.9	
3	14 50.3	14 53.0	54 20.4	0.75	54 30.5	0.92	15 35.8	2.08	18.9	
4	14 56.4	15 0.3	54 42.7	1.10	54 57.0	1.28	16 25.3	2.04	19.9	
5	15 4.7	15 9.8	55 13.4	1.46	55 32.0	1.64	17 13.7	1.99	20.9	
6	15 15.4	15 21.6	55 52.7	1.81	56 15.4	1.97	18 1.0	1.95	21.9	
7	15 28.3	15 35.4	56 40.0	2.12	57 6.2	2.25	18 47.6	1.94	22.9	
8	15 42.9	15 50.7	57 33.8	2.34	58 2.4	2.40	19 34.4	1.97	23.9	
9	15 58.6	16 6.5	58 31.4	2.41	59 0.3	2.38	20 22.4	2.05	24.9	
10	16 14.1	16 21.4	59 28.5	2.30	59 55.3	2.15	21 13.0	2.18	25.9	
11	16 28.1	16 34.1	60 19.9	1.94	60 41.7	1.67	22 7.3	2.36	26.9	
12	16 39.0	16 42.8	60 59.9	1.34	61 13.8	0.97	23 6.1	2.55	27.9	
13	16 45.4	16 46.5	61 23.1	+0.56	61 27.3	+0.14	6		28.9	
14	16 46.3	16 44.6	61 26.4	-0.29	61 20.3	-0.71	0 9.1	2.70	0.5	
15	16 41.6	16 37.4	61 9.3	1.11	60 53.8	1.46	1 14.6	2.74	1.5	
16	16 32.1	16 26.0	60 34.4	1.76	60 11.7	2.00	2 19.7	2.65	2.5	
17	16 19.0	16 11.6	59 46.4	2.18	59 19.2	2.32	3 21.4	2.47	3.5	
18	16 3.9	15 56.1	58 50.8	2.38	58 22.1	2.38	4 18.1	2.25	4.5	
19	15 48.3	15 40.8	57 53.6	2.34	57 25.8	2.27	5 9.7	2.05	5.5	
20	15 33.5	15 26.6	56 59.1	2.16	56 33.9	2.03	5 57.0	1.89	6.5	
21	15 20.2	15 14.3	56 10.3	1.88	55 48.7	1.72	6 41.2	1.79	7.5	
22	15 9.0	15 4.2	55 29.1	1.55	55 11.5	1.38	7 23.5	1.74	8.5	
23	14 59.9	14 56.2	54 55.9	1.21	54 42.3	1.05	8 5.1	1.74	9.5	
24	14 53.0	14 50.4	54 30.6	0.89	54 20.9	0.74	8 47.1	1.77	10.5	
25	14 48.2	14 46.6	54 12.9	0.59	54 6.7	0.45	9 30.4	1.84	11.5	
26	14 45.3	14 44.5	54 2.1	0.31	53 59.0	-0.19	10 15.4	1.92	12.5	
27	14 44.0	14 43.9	53 57.4	-0.07	53 57.1	+0.04	11 2.5	2.01	13.5	
28	14 44.2	14 44.8	53 58.2	+0.14	54 0.5	0.24	11 51.5	2.07	14.5	
29	14 45.8	14 47.1	54 4.0	0.35	54 8.8	0.45	12 41.7	2.11	15.5	
30	14 48.8	14 50.8	54 14.8	0.56	54 22.1	0.66	13 32.2	2.10	16.5	
31	14 53.1	14 55.8	54 30.8	0.77	54 40.8	0.89	14 22.1	2.05	17.5	
32	14 58.9	15 2.5	54 52.3	+1.01	55 5.2	+1.13	15 10.6	1.99	18.5	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 1.					MONDAY 3.				
0	4 9 3.58	2.1497	N.24° 30' 53.4"	3.610	0	5 53 44.69	2.1909	N.25° 6' 58.9"	2.106
1	4 11 12.63	2.1518	24 34 26.6	3.496	1	5 55 56.13	2.1903	25 4 45.3	2.987
2	4 13 21.80	2.1539	24 37 52.9	3.380	2	5 58 7.53	2.1898	25 2 24.4	2.400
3	4 15 31.10	2.1559	24 41 12.2	3.264	3	6 0 18.90	2.1892	24 59 56.2	2.531
4	4 17 40.51	2.1578	24 44 24.6	3.149	4	6 2 30.23	2.1885	24 57 20.7	2.658
5	4 19 50.04	2.1598	24 47 30.1	3.033	5	6 4 41.52	2.1878	24 54 37.9	2.773
6	4 21 59.69	2.1617	24 50 28.6	2.917	6	6 6 52.77	2.1871	24 51 47.9	2.894
7	4 24 9.45	2.1635	24 53 20.1	2.799	7	6 9 3.98	2.1863	24 48 50.6	3.015
8	4 26 19.31	2.1658	24 56 4.5	2.689	8	6 11 15.13	2.1854	24 45 46.1	3.136
9	4 28 29.28	2.1670	24 58 41.9	2.584	9	6 13 26.23	2.1845	24 42 34.3	3.257
10	4 30 39.35	2.1687	25 1 12.2	2.446	10	6 15 37.27	2.1836	24 39 15.3	3.377
11	4 32 49.52	2.1703	25 3 35.4	2.328	11	6 17 48.26	2.1827	24 35 49.1	3.496
12	4 34 59.78	2.1718	25 5 51.6	2.210	12	6 19 59.19	2.1816	24 32 15.8	3.615
13	4 37 10.14	2.1733	25 8 0.6	2.090	13	6 22 10.05	2.1805	24 28 35.3	3.736
14	4 39 20.58	2.1747	25 10 2.4	1.971	14	6 24 20.85	2.1794	24 24 47.5	3.856
15	4 41 31.11	2.1768	25 11 57.1	1.852	15	6 26 31.58	2.1783	24 20 52.6	3.974
16	4 43 41.73	2.1778	25 13 44.6	1.739	16	6 28 42.24	2.1771	24 16 50.6	4.093
17	4 45 52.42	2.1788	25 15 24.9	1.619	17	6 30 52.83	2.1758	24 12 41.5	4.212
18	4 48 3.19	2.1801	25 16 58.1	1.499	18	6 33 3.34	2.1746	24 8 25.2	4.330
19	4 50 14.03	2.1813	25 18 24.0	1.379	19	6 35 13.78	2.1732	24 4 1.9	4.448
20	4 52 24.94	2.1824	25 19 42.7	1.251	20	6 37 24.13	2.1718	23 59 31.5	4.566
21	4 54 35.92	2.1835	25 20 54.1	1.130	21	6 39 34.40	2.1705	23 54 54.0	4.683
22	4 56 46.96	2.1845	25 21 58.3	1.009	22	6 41 44.59	2.1691	23 50 9.5	4.800
23	4 58 58.06	2.1854	N.25 22 55.2	0.888	23	6 43 54.69	2.1678	N.23 45 18.0	4.916
SUNDAY 2.					TUESDAY 4.				
0	5 1 9.21	2.1863	N.25 23 44.9	0.767	0	6 46 4.70	2.1661	N.23 40 19.6	5.033
1	5 3 20.42	2.1879	25 24 27.3	0.646	1	6 48 14.62	2.1646	23 35 14.1	5.149
2	5 5 31.67	2.1879	25 25 2.4	0.524	2	6 50 24.45	2.1630	23 30 1.7	5.264
3	5 7 42.97	2.1887	25 25 30.2	0.409	3	6 52 34.18	2.1614	23 24 42.4	5.379
4	5 9 54.31	2.1893	25 25 50.6	0.279	4	6 54 43.82	2.1598	23 19 16.2	5.494
5	5 12 5.69	2.1900	25 26 3.7	0.157	5	6 56 53.36	2.1589	23 13 43.1	5.608
6	5 14 17.11	2.1906	25 26 9.5	+0.036	6	6 59 2.81	2.1586	23 8 3.2	5.723
7	5 16 28.56	2.1910	25 26 8.0	-0.087	7	7 1 12.15	2.1549	23 2 16.4	5.837
8	5 18 40.03	2.1914	25 25 59.1	0.209	8	7 3 21.39	2.1539	22 56 22.8	5.949
9	5 20 51.53	2.1918	25 25 42.9	0.331	9	7 5 30.53	2.1515	22 50 22.5	6.062
10	5 23 3.05	2.1928	25 25 19.4	0.453	10	7 7 39.57	2.1497	22 44 15.4	6.175
11	5 25 14.59	2.1935	25 24 48.5	0.576	11	7 9 48.50	2.1479	22 38 1.5	6.287
12	5 27 26.15	2.1937	25 24 10.3	0.698	12	7 11 57.32	2.1468	22 31 40.9	6.399
13	5 29 37.71	2.1938	25 23 24.7	0.821	13	7 14 6.04	2.1444	22 25 13.6	6.510
14	5 31 49.28	2.1939	25 22 31.8	0.943	14	7 16 14.65	2.1425	22 18 39.7	6.620
15	5 34 0.86	2.1930	25 21 31.5	1.066	15	7 18 23.14	2.1406	22 11 59.2	6.731
16	5 36 12.44	2.1929	25 20 23.9	1.188	16	7 20 31.52	2.1387	22 5 12.0	6.841
17	5 38 24.01	2.1928	25 19 9.0	1.310	17	7 22 39.79	2.1369	21 58 18.3	6.950
18	5 40 35.58	2.1927	25 17 46.7	1.432	18	7 24 47.95	2.1350	21 51 18.0	7.059
19	5 42 47.14	2.1926	25 16 17.1	1.555	19	7 26 55.99	2.1331	21 44 11.2	7.168
20	5 44 58.69	2.1923	25 14 40.1	1.677	20	7 29 3.92	2.1319	21 36 57.9	7.276
21	5 47 10.22	2.1920	25 12 55.8	1.799	21	7 31 11.74	2.1293	21 29 38.1	7.383
22	5 49 21.73	2.1917	25 11 4.2	1.922	22	7 33 19.44	2.1274	21 22 11.9	7.490
23	5 51 33.22	2.1913	25 9 5.2	2.044	23	7 35 27.03	2.1256	21 14 39.3	7.596
24	5 53 44.69	2.1909	N.25 6 58.9	2.166	24	7 37 34.51	2.1237	N.21 7 0.4	7.702

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 5.					FRIDAY 7.				
0	7 37 34.51	2.1937	N.21° 7' 0.4	7.709	0	9 17 29.26	2.0487	N.13° 6' 0.6	12.101
1	7 39 41.87	2.1917	20 59 15.1	7.806	1	9 19 32.16	2.0480	12 53 52.3	12.176
2	7 41 49.11	2.1197	20 51 23.5	7.913	2	9 21 35.02	2.0473	12 41 39.5	12.260
3	7 43 56.24	2.1178	20 43 25.6	8.018	3	9 23 37.83	2.0466	12 29 22.3	12.334
4	7 46 3.25	2.1158	20 35 21.4	8.129	4	9 25 40.61	2.0460	12 17 0.6	12.398
5	7 48 10.14	2.1139	20 27 11.0	8.234	5	9 27 43.35	2.0454	12 4 34.5	12.470
6	7 50 16.92	2.1120	20 18 54.5	8.337	6	9 29 46.06	2.0449	11 52 4.2	12.541
7	7 52 23.58	2.1101	20 10 31.8	8.439	7	9 31 48.74	2.0445	11 39 29.6	12.619
8	7 54 30.13	2.1082	20 2 3.0	8.531	8	9 33 51.40	2.0441	11 26 50.7	12.683
9	7 56 36.56	2.1063	19 53 28.1	8.629	9	9 35 54.03	2.0438	11 14 7.6	12.752
10	7 58 42.88	2.1044	19 44 47.1	8.733	10	9 37 56.65	2.0435	11 1 20.4	12.821
11	8 0 49.09	2.1025	19 36 0.1	8.833	11	9 39 59.25	2.0433	10 48 29.1	12.886
12	8 2 55.18	2.1006	19 27 7.2	8.939	12	9 42 1.84	2.0430	10 35 33.8	12.955
13	8 5 1.16	2.0987	19 18 8.3	9.031	13	9 44 4.42	2.0430	10 22 34.5	13.022
14	8 7 7.03	2.0968	19 9 3.5	9.129	14	9 46 7.00	2.0429	10 9 31.2	13.087
15	8 9 12.78	2.0949	18 59 52.8	9.227	15	9 48 9.57	2.0428	9 56 24.0	13.152
16	8 11 18.42	2.0930	18 50 36.2	9.325	16	9 50 12.14	2.0429	9 43 13.0	13.215
17	8 13 23.96	2.0914	18 41 13.8	9.421	17	9 52 14.72	2.0431	9 29 58.2	13.278
18	8 15 29.39	2.0896	18 31 45.7	9.517	18	9 54 17.31	2.0433	9 16 39.6	13.341
19	8 17 34.71	2.0878	18 22 11.8	9.612	19	9 56 19.91	2.0435	9 3 17.3	13.403
20	8 19 39.92	2.0860	18 12 32.2	9.707	20	9 58 22.53	2.0438	8 49 51.4	13.466
21	8 21 45.03	2.0843	18 2 46.9	9.802	21	10 0 25.17	2.0442	8 36 21.9	13.528
22	8 23 50.04	2.0826	17 52 56.0	9.895	22	10 2 27.83	2.0446	8 22 48.8	13.581
23	8 25 54.94	2.0809	N.17 42 59.5	9.988	23	10 4 30.52	2.0451	N. 8 9 12.2	13.636
THURSDAY 6.					SATURDAY 8.				
0	8 27 59.74	2.0792	N.17 32 57.4	10.081	0	10 6 33.24	2.0456	N. 7 55 32.2	13.695
1	8 30 4.44	2.0775	17 22 49.8	10.172	1	10 8 35.99	2.0463	7 41 48.8	13.759
2	8 32 9.04	2.0759	17 12 36.7	10.263	2	10 10 38.79	2.0470	7 28 2.0	13.807
3	8 34 13.55	2.0743	17 2 18.2	10.353	3	10 12 41.63	2.0478	7 14 12.0	13.860
4	8 36 17.96	2.0727	16 51 54.3	10.443	4	10 14 44.52	2.0486	7 0 18.8	13.913
5	8 38 22.28	2.0712	16 41 25.0	10.532	5	10 16 47.46	2.0495	6 46 22.4	13.966
6	8 40 26.50	2.0696	16 30 50.4	10.621	6	10 18 50.46	2.0505	6 32 22.9	14.017
7	8 42 30.63	2.0682	16 20 10.5	10.709	7	10 20 53.52	2.0515	6 18 20.4	14.067
8	8 44 34.68	2.0667	16 9 25.3	10.797	8	10 22 56.64	2.0526	6 4 14.8	14.117
9	8 46 38.64	2.0653	15 58 34.9	10.883	9	10 24 59.83	2.0538	5 50 6.3	14.166
10	8 48 42.52	2.0640	15 47 39.3	10.969	10	10 27 3.09	2.0550	5 35 54.9	14.213
11	8 50 46.32	2.0626	15 36 38.6	11.054	11	10 29 6.43	2.0563	5 21 40.7	14.260
12	8 52 50.03	2.0613	15 25 32.8	11.139	12	10 31 9.85	2.0577	5 7 23.7	14.306
13	8 54 53.67	2.0600	15 14 21.9	11.223	13	10 33 13.35	2.0592	4 53 4.0	14.350
14	8 56 57.23	2.0588	15 3 6.0	11.306	14	10 35 16.95	2.0607	4 38 41.7	14.393
15	8 59 0.72	2.0576	14 51 45.2	11.388	15	10 37 20.64	2.0623	4 24 16.8	14.436
16	9 1 4.14	2.0564	14 40 19.4	11.471	16	10 39 24.43	2.0640	4 9 49.4	14.477
17	9 3 7.49	2.0553	14 28 48.7	11.552	17	10 41 28.32	2.0658	3 55 19.5	14.517
18	9 5 10.78	2.0542	14 17 13.2	11.632	18	10 43 32.32	2.0676	3 40 47.3	14.566
19	9 7 14.00	2.0532	14 5 32.9	11.712	19	10 45 36.43	2.0695	3 26 12.8	14.595
20	9 9 17.16	2.0522	13 53 47.8	11.791	20	10 47 40.66	2.0714	3 11 35.9	14.633
21	9 11 20.27	2.0513	13 41 58.0	11.869	21	10 49 45.00	2.0734	2 56 56.8	14.669
22	9 13 23.32	2.0504	13 30 3.5	11.947	22	10 51 49.47	2.0756	2 42 15.6	14.703
23	9 15 26.32	2.0495	13 18 4.4	12.024	23	10 53 54.08	2.0779	2 27 32.4	14.737
24	9 17 29.26	2.0487	N.13 6 0.6	12.101	24	10 55 58.82	2.0803	N. 2 12 47.2	14.770

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 9.					TUESDAY 11.				
0	<sup>h</sup> 10 <sup>m</sup> 55 <sup>s</sup> 58.82	2.0808	N. 2° 12' 47".2	14.770	0	<sup>h</sup> 12 <sup>m</sup> 39 <sup>s</sup> 57.18	2.9890	S. 9° 48' 41".4	14.710
1	10 58 3.70	2.0825	1 58 0.0	14.809	1	12 42 14.28	2.9880	10 3 22.8	14.688
2	11 0 8.72	2.0849	1 43 11.0	14.839	2	12 44 31.74	2.9841	10 18 1.6	14.694
3	11 2 13.89	2.0875	1 28 20.2	14.861	3	12 46 49.57	2.9808	10 32 37.7	14.579
4	11 4 19.22	2.0901	1 13 27.7	14.880	4	12 49 7.77	2.9764	10 47 11.1	14.538
5	11 6 24.70	2.0927	0 58 33.5	14.916	5	12 51 26.34	2.9727	11 1 41.6	14.488
6	11 8 30.34	2.0954	0 43 37.8	14.941	6	12 53 45.29	2.9700	11 16 9.0	14.431
7	11 10 36.15	2.0983	0 28 40.6	14.965	7	12 56 4.62	2.9654	11 30 33.3	14.377
8	11 12 42.14	2.1019	N. 0 13 42.0	14.988	8	12 58 24.34	2.9319	11 44 54.3	14.389
9	11 14 48.30	2.1049	S. 0 1 18.0	15.010	9	13 0 44.45	2.9384	11 59 12.0	14.385
10	11 16 54.64	2.1073	0 16 19.2	15.031	10	13 3 4.95	2.9449	12 13 26.1	14.395
11	11 19 1.17	2.1104	0 31 21.7	15.051	11	13 5 25.84	2.9515	12 27 36.6	14.144
12	11 21 7.89	2.1136	0 46 25.3	15.068	12	13 7 47.13	2.9589	12 41 43.4	14.081
13	11 23 14.80	2.1169	1 1 29.9	15.085	13	13 10 8.82	2.9648	12 55 46.3	14.015
14	11 25 21.92	2.1203	1 16 35.5	15.100	14	13 12 30.91	2.9716	13 9 45.2	13.947
15	11 27 29.24	2.1237	1 31 41.9	15.113	15	13 14 53.41	2.9784	13 23 40.0	13.877
16	11 29 36.77	2.1273	1 46 49.1	15.126	16	13 17 16.32	2.9852	13 37 30.5	13.805
17	11 31 44.52	2.1310	2 1 57.0	15.137	17	13 19 39.64	2.9921	13 51 16.6	13.738
18	11 33 52.49	2.1347	2 17 5.6	15.147	18	13 22 3.37	2.9990	14 4 58.3	13.666
19	11 36 0.68	2.1384	2 32 14.7	15.156	19	13 24 27.52	2.4059	14 18 35.3	13.577
20	11 38 9.10	2.1423	2 47 24.3	15.163	20	13 26 52.08	2.4126	14 32 7.6	13.497
21	11 40 17.76	2.1463	3 2 34.2	15.167	21	13 29 17.06	2.4198	14 45 35.0	13.414
22	11 42 26.66	2.1503	3 17 44.4	15.173	22	13 31 42.46	2.4269	14 58 57.3	13.329
23	11 44 35.80	2.1543	S. 3 32 54.8	15.175	23	13 34 8.29	2.4340	S. 15 12 14.5	13.243
MONDAY 10.					WEDNESDAY 12.				
0	11 46 45.18	2.1585	S. 3 48 5.4	15.176	0	13 36 34.54	2.4410	S. 15 25 26.5	13.155
1	11 48 54.82	2.1628	4 3 15.9	15.175	1	13 39 1.21	2.4481	15 38 33.1	13.083
2	11 51 4.72	2.1673	4 18 26.4	15.173	2	13 41 28.31	2.4552	15 51 34.1	12.970
3	11 53 14.88	2.1716	4 33 36.7	15.169	3	13 43 55.84	2.4624	16 4 29.5	12.875
4	11 55 25.31	2.1761	4 48 46.7	15.164	4	13 46 23.80	2.4696	16 17 19.1	12.777
5	11 57 36.01	2.1807	5 3 56.4	15.158	5	13 48 52.18	2.4768	16 30 2.8	12.677
6	11 59 46.99	2.1853	5 19 5.7	15.150	6	13 51 20.99	2.4837	16 42 40.4	12.575
7	12 1 58.25	2.1901	5 34 14.4	15.140	7	13 53 50.23	2.4909	16 55 11.8	12.471
8	12 4 9.80	2.1949	5 49 22.5	15.128	8	13 56 19.90	2.4981	17 7 36.9	12.365
9	12 6 21.64	2.1998	6 4 29.8	15.115	9	13 58 50.00	2.5052	17 19 55.6	12.257
10	12 8 33.77	2.2047	6 19 36.3	15.100	10	14 1 20.53	2.5124	17 32 7.7	12.146
11	12 10 46.20	2.2097	6 34 41.8	15.083	11	14 3 51.49	2.5195	17 44 13.1	12.033
12	12 12 58.94	2.2149	6 49 46.3	15.066	12	14 6 22.87	2.5266	17 56 11.7	11.918
13	12 15 11.99	2.2201	7 4 49.7	15.046	13	14 8 54.68	2.5337	18 8 3.3	11.801
14	12 17 25.35	2.2253	7 19 51.8	15.024	14	14 11 26.92	2.5408	18 19 47.8	11.689
15	12 19 39.03	2.2307	7 34 52.6	15.001	15	14 13 59.58	2.5478	18 31 25.1	11.580
16	12 21 53.03	2.2361	7 49 51.9	14.976	16	14 16 32.66	2.5548	18 42 55.0	11.457
17	12 24 7.36	2.2416	8 4 49.7	14.949	17	14 19 6.16	2.5618	18 54 17.5	11.318
18	12 26 22.02	2.2471	8 19 45.8	14.920	18	14 21 40.08	2.5688	19 5 32.4	11.183
19	12 28 37.01	2.2527	8 34 40.1	14.890	19	14 24 14.42	2.5757	19 16 39.5	11.053
20	12 30 52.35	2.2585	8 49 32.6	14.858	20	14 26 49.17	2.5826	19 27 36.8	10.928
21	12 33 8.03	2.2643	9 4 23.1	14.824	21	14 29 24.33	2.5894	19 38 30.1	10.787
22	12 35 24.06	2.2701	9 19 11.5	14.787	22	14 31 59.90	2.5962	19 49 13.3	10.651
23	12 37 40.44	2.2760	9 33 57.6	14.749	23	14 34 35.87	2.6029	19 59 48.2	10.513
24	12 39 57.18	2.2820	S. 9 48 41.4	14.710	24	14 37 12.25	2.6097	S. 20 10 14.8	10.373

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 13.					SATURDAY 15.				
0	14 <sup>h</sup> 37 <sup>m</sup> 12.25	2.6097	S. 20° 10' 14.8	10.373	0	16 <sup>h</sup> 48 <sup>m</sup> 7.18	2.7874	S. 25° 14' 34.4	1.843
1	14 39 49.03	2.6103	20 20 33.0	10.231	1	16 50 54.41	2.7868	25 16 19.1	1.846
2	14 42 26.20	2.6098	20 30 42.5	10.086	2	16 53 41.60	2.7862	25 17 51.9	1.448
3	14 45 3.76	2.6093	20 40 43.3	9.940	3	16 56 28.75	2.7853	25 19 12.8	1.950
4	14 47 41.71	2.6357	20 50 35.3	9.793	4	16 59 15.84	2.7849	25 20 21.9	1.052
5	14 50 20.04	2.6420	21 0 18.3	9.641	5	17 2 2.85	2.7828	25 21 19.1	0.855
6	14 52 58.75	2.6492	21 9 52.2	9.488	6	17 4 49.78	2.7813	25 22 4.5	0.658
7	14 55 37.83	2.6544	21 19 16.9	9.335	7	17 7 36.61	2.7796	25 22 38.1	0.462
8	14 58 17.28	2.6605	21 28 32.4	9.180	8	17 10 23.38	2.7778	25 22 59.9	0.265
9	15 0 57.09	2.6664	21 37 38.5	9.022	9	17 13 9.94	2.7757	25 23 9.9	-0.069
10	15 3 37.25	2.6732	21 46 35.1	8.863	10	17 15 56.41	2.7733	25 23 8.2	+0.126
11	15 6 17.76	2.6781	21 55 22.1	8.702	11	17 18 42.73	2.7707	25 22 54.8	0.322
12	15 8 58.62	2.6838	22 3 50.3	8.538	12	17 21 28.90	2.7681	25 22 29.6	0.517
13	15 11 39.81	2.6893	22 12 26.7	8.374	13	17 24 14.90	2.7652	25 21 52.8	0.710
14	15 14 21.33	2.6948	22 20 44.2	8.207	14	17 27 0.72	2.7622	25 21 4.4	0.902
15	15 17 3.18	2.7002	22 28 51.6	8.039	15	17 29 46.36	2.7589	25 20 4.5	1.094
16	15 19 45.35	2.7053	22 36 48.9	7.870	16	17 32 31.79	2.7554	25 18 53.1	1.286
17	15 22 27.82	2.7103	22 44 36.0	7.698	17	17 35 17.01	2.7518	25 17 30.2	1.477
18	15 25 10.59	2.7152	22 52 12.7	7.525	18	17 38 2.01	2.7480	25 15 55.8	1.667
19	15 27 53.65	2.7201	22 59 39.0	7.351	19	17 40 46.77	2.7440	25 14 10.1	1.856
20	15 30 37.00	2.7248	23 6 54.8	7.176	20	17 43 31.29	2.7399	25 12 13.1	2.044
21	15 33 20.63	2.7293	23 14 0.1	6.999	21	17 46 15.56	2.7356	25 10 4.8	2.232
22	15 36 4.52	2.7337	23 20 54.7	6.820	22	17 48 59.56	2.7311	25 7 45.3	2.418
23	15 38 48.67	2.7379	S. 23° 27' 38.5	6.639	23	17 51 43.29	2.7265	S. 25° 5' 14.7	2.603
FRIDAY 14.					SUNDAY 16.				
0	15 41 33.07	2.7420	S. 23° 34' 11.4	6.458	0	17 54 26.74	2.7217	S. 25° 2' 33.0	2.787
1	15 44 17.71	2.7460	23 40 33.4	6.276	1	17 57 9.89	2.7167	24 59 40.3	2.980
2	15 47 2.59	2.7498	23 46 44.5	6.092	2	17 59 52.74	2.7115	24 56 36.7	3.151
3	15 49 47.69	2.7534	23 52 44.5	5.907	3	18 2 35.27	2.7062	24 53 22.2	3.321
4	15 52 33.00	2.7568	23 58 33.3	5.721	4	18 5 17.48	2.7008	24 49 57.0	3.510
5	15 55 18.51	2.7601	24 4 11.0	5.534	5	18 7 59.36	2.6952	24 46 21.0	3.688
6	15 58 4.21	2.7632	24 9 37.4	5.346	6	18 10 40.90	2.6894	24 42 34.4	3.865
7	16 0 50.09	2.7661	24 14 52.5	5.157	7	18 13 22.09	2.6836	24 38 37.2	4.040
8	16 3 36.14	2.7689	24 19 56.2	4.967	8	18 16 2.93	2.6776	24 34 29.6	4.213
9	16 6 22.36	2.7716	24 24 48.5	4.776	9	18 18 43.40	2.6714	24 30 11.6	4.386
10	16 9 8.73	2.7739	24 29 29.3	4.584	10	18 21 23.50	2.6652	24 25 43.3	4.557
11	16 11 55.23	2.7761	24 33 58.6	4.392	11	18 24 3.22	2.6589	24 21 4.8	4.726
12	16 14 41.86	2.7782	24 38 16.4	4.199	12	18 26 42.55	2.6523	24 16 16.2	4.893
13	16 17 28.61	2.7800	24 42 22.5	4.004	13	18 29 21.49	2.6457	24 11 17.6	5.059
14	16 20 15.46	2.7816	24 46 16.9	3.810	14	18 32 0.03	2.6389	24 6 9.1	5.224
15	16 23 2.40	2.7831	24 49 59.7	3.616	15	18 34 38.16	2.6321	24 0 50.7	5.387
16	16 25 49.43	2.7844	24 53 30.8	3.420	16	18 37 15.88	2.6252	23 55 22.6	5.549
17	16 28 36.53	2.7854	24 56 50.1	3.223	17	18 39 53.18	2.6181	23 49 44.8	5.709
18	16 31 23.68	2.7863	24 59 57.6	3.027	18	18 42 30.05	2.6109	23 43 57.5	5.867
19	16 34 10.88	2.7870	25 2 53.3	2.830	19	18 45 6.49	2.6037	23 38 0.8	6.023
20	16 36 58.12	2.7875	25 5 37.2	2.633	20	18 47 42.50	2.5964	23 31 54.7	6.178
21	16 39 45.38	2.7877	25 8 9.3	2.436	21	18 50 18.06	2.5890	23 25 39.4	6.331
22	16 42 32.65	2.7878	25 10 29.5	2.238	22	18 52 53.18	2.5815	23 19 15.0	6.482
23	16 45 19.92	2.7877	25 12 37.9	2.041	23	18 55 27.84	2.5739	23 12 41.5	6.639
24	16 48 7.18	2.7874	S. 25° 14' 34.4	1.843	24	18 58 2.05	2.5663	S. 23° 5' 59.1	6.780



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 17.					WEDNESDAY 19.				
0	18 58 2.05	2.5663	S. 23° 5' 59.1"	6.780	0	20 51 57.24	2.1851	S. 15° 24' 22.5"	11.778
1	19 0 35.80	2.5587	22 59 7.9	6.986	1	20 54 8.13	2.1780	15 12 33.9	11.842
2	19 3 9.09	2.5509	22 52 8.0	7.071	2	20 56 18.60	2.1709	15 0 41.5	11.903
3	19 5 41.91	2.5431	22 44 59.4	7.914	3	20 58 28.64	2.1638	14 48 45.5	11.963
4	19 8 14.26	2.5353	22 37 42.3	7.354	4	21 0 38.26	2.1569	14 36 45.9	12.022
5	19 10 46.13	2.5275	22 30 16.9	7.483	5	21 2 47.47	2.1501	14 24 42.8	12.079
6	19 13 17.53	2.5193	22 22 43.2	7.630	6	21 4 56.27	2.1433	14 12 36.4	12.134
7	19 15 48.45	2.5113	22 15 1.3	7.785	7	21 7 4.66	2.1365	14 0 26.7	12.188
8	19 18 18.89	2.5033	22 7 11.4	7.898	8	21 9 12.65	2.1298	13 48 13.8	12.242
9	19 20 48.84	2.4954	21 59 13.5	8.031	9	21 11 20.24	2.1233	13 35 57.7	12.293
10	19 23 18.31	2.4871	21 51 7.7	8.181	10	21 13 27.44	2.1167	13 23 38.6	12.343
11	19 25 47.29	2.4789	21 42 54.2	8.368	11	21 15 34.25	2.1103	13 11 16.5	12.392
12	19 28 15.78	2.4706	21 34 33.1	8.414	12	21 17 40.67	2.1038	12 58 51.6	12.439
13	19 30 43.78	2.4626	21 26 4.5	8.538	13	21 19 46.71	2.0976	12 46 23.9	12.485
14	19 33 11.29	2.4543	21 17 28.5	8.682	14	21 21 52.38	2.0913	12 33 53.4	12.530
15	19 35 38.30	2.4461	21 8 45.1	8.763	15	21 23 57.67	2.0851	12 21 20.3	12.573
16	19 38 4.82	2.4379	20 59 54.6	8.901	16	21 26 2.59	2.0791	12 8 44.6	12.616
17	19 40 30.85	2.4297	20 50 57.0	9.018	17	21 28 7.16	2.0733	11 56 6.4	12.657
18	19 42 56.38	2.4214	20 41 52.4	9.133	18	21 30 11.37	2.0673	11 43 25.8	12.697
19	19 45 21.42	2.4131	20 32 41.0	9.247	19	21 32 15.22	2.0613	11 30 42.8	12.736
20	19 47 45.96	2.4048	20 23 22.8	9.358	20	21 34 18.73	2.0556	11 17 57.6	12.773
21	19 50 10.00	2.3966	20 13 58.0	9.468	21	21 36 21.89	2.0498	11 5 10.2	12.807
22	19 52 33.55	2.3884	20 4 26.7	9.576	22	21 38 24.71	2.0443	10 52 20.7	12.842
23	19 54 56.61	2.3803	S. 19° 54' 48.9"	9.682	23	21 40 27.20	2.0387	S. 10° 39' 29.1"	12.876
TUESDAY 18.					THURSDAY 20.				
0	19 57 19.17	2.3719	S. 19° 45' 4.8"	9.787	0	21 42 29.35	2.0332	S. 10° 26' 35.6"	12.906
1	19 59 41.24	2.3637	19 35 14.5	9.889	1	21 44 31.18	2.0278	10 13 40.2	12.939
2	20 2 2.82	2.3556	19 25 18.1	9.990	2	21 46 32.69	2.0226	10 0 42.9	12.970
3	20 4 23.91	2.3474	19 15 15.7	10.089	3	21 48 33.89	2.0174	9 47 43.8	12.999
4	20 6 44.51	2.3393	19 5 7.4	10.187	4	21 50 34.78	2.0123	9 34 43.0	13.027
5	20 9 4.62	2.3312	18 54 53.3	10.283	5	21 52 35.37	2.0073	9 21 40.6	13.053
6	20 11 24.25	2.3233	18 44 33.6	10.375	6	21 54 35.65	2.0022	9 8 36.7	13.078
7	20 13 43.40	2.3151	18 34 8.3	10.467	7	21 56 35.64	1.9974	8 55 31.3	13.103
8	20 16 2.06	2.3070	18 23 37.5	10.558	8	21 58 35.34	1.9926	8 42 24.4	13.127
9	20 18 20.24	2.2990	18 13 1.3	10.647	9	22 0 34.75	1.9878	8 29 16.1	13.149
10	20 20 37.94	2.2911	18 2 19.9	10.733	10	22 2 33.88	1.9833	8 16 6.5	13.170
11	20 22 55.17	2.2832	17 51 33.3	10.819	11	22 4 32.74	1.9787	8 2 55.7	13.190
12	20 25 11.93	2.2754	17 40 41.6	10.902	12	22 6 31.32	1.9741	7 49 43.7	13.209
13	20 27 28.22	2.2676	17 29 45.0	10.984	13	22 8 29.63	1.9697	7 36 30.6	13.227
14	20 29 44.04	2.2598	17 18 43.5	11.064	14	22 10 27.69	1.9655	7 23 16.4	13.244
15	20 31 59.40	2.2521	17 7 37.3	11.143	15	22 12 25.49	1.9613	7 10 1.3	13.259
16	20 34 14.29	2.2444	16 56 26.4	11.220	16	22 14 23.04	1.9571	6 56 45.3	13.275
17	20 36 28.73	2.2368	16 45 10.9	11.296	17	22 16 20.34	1.9530	6 43 28.3	13.291
18	20 38 42.71	2.2292	16 33 50.9	11.370	18	22 18 17.40	1.9491	6 30 10.4	13.304
19	20 40 56.24	2.2217	16 22 26.5	11.442	19	22 20 14.23	1.9452	6 16 51.8	13.316
20	20 43 9.32	2.2143	16 10 57.9	11.512	20	22 22 10.82	1.9413	6 3 32.5	13.327
21	20 45 21.96	2.2070	15 59 25.1	11.581	21	22 24 7.18	1.9375	5 50 12.6	13.337
22	20 47 34.16	2.1997	15 47 48.2	11.648	22	22 26 3.32	1.9339	5 36 52.1	13.347
23	20 49 45.92	2.1923	15 36 7.3	11.714	23	22 27 59.25	1.9303	5 23 31.0	13.355
24	20 51 57.24	2.1851	S. 15° 24' 22.5"	11.778	24	22 29 54.96	1.9268	S. 5° 10' 9.5"	13.362

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 21.					SUNDAY 23.				
0	22 29 54.96	1.9908	S. 5 10' 9.5"	13.389	0	23 59 50.92	1.9487	N. 5 24' 19.5"	12.783
1	22 31 50.47	1.9934	4 56 47.6	13.368	1	0 1 41.85	1.8489	5 37 5.6	12.759
2	22 33 45.77	1.9960	4 43 25.3	13.375	2	0 3 32.79	1.8492	5 49 49.8	12.739
3	22 35 40.87	1.9167	4 30 2.6	13.381	3	0 5 23.75	1.8494	6 2 32.2	12.691
4	22 37 35.78	1.9136	4 16 30.6	13.384	4	0 7 14.72	1.8497	6 15 12.7	12.659
5	22 39 30.50	1.9105	4 3 16.5	13.387	5	0 9 5.72	1.8503	6 27 51.3	12.637
6	22 41 25.04	1.9075	3 49 53.2	13.389	6	0 10 56.74	1.8506	6 40 27.9	12.593
7	22 43 19.40	1.9046	3 36 29.8	13.391	7	0 12 47.79	1.8511	6 53 2.5	12.559
8	22 45 13.59	1.9017	3 23 6.3	13.393	8	0 14 38.87	1.8516	7 5 35.0	12.594
9	22 47 7.61	1.8989	3 9 42.8	13.391	9	0 16 29.98	1.8522	7 18 5.4	12.489
10	22 49 1.46	1.8963	2 56 19.4	13.390	10	0 18 21.13	1.8529	7 30 33.7	12.459
11	22 50 55.15	1.8936	2 42 56.0	13.388	11	0 20 12.33	1.8537	7 42 59.7	12.415
12	22 52 48.69	1.8911	2 29 32.8	13.385	12	0 22 3.57	1.8544	7 55 23.5	12.378
13	22 54 42.08	1.8886	2 16 9.8	13.389	13	0 23 54.86	1.8553	8 7 45.1	12.340
14	22 56 35.32	1.8860	2 2 47.0	13.378	14	0 25 46.21	1.8560	8 20 4.3	12.301
15	22 58 28.42	1.8835	1 49 24.5	13.373	15	0 27 37.61	1.8573	8 32 21.2	12.262
16	23 0 21.39	1.8817	1 36 2.3	13.367	16	0 29 29.08	1.8583	8 44 35.7	12.239
17	23 2 14.22	1.8794	1 22 40.5	13.359	17	0 31 20.61	1.8594	8 56 47.8	12.199
18	23 4 6.92	1.8773	1 9 19.2	13.359	18	0 33 12.21	1.8606	9 8 57.5	12.140
19	23 5 59.50	1.8754	0 55 58.3	13.344	19	0 35 3.88	1.8618	9 21 4.6	12.066
20	23 7 51.97	1.8735	0 42 37.9	13.335	20	0 36 55.63	1.8631	9 33 9.2	12.055
21	23 9 44.32	1.8716	0 29 18.1	13.325	21	0 38 47.45	1.8643	9 45 11.2	12.011
22	23 11 36.56	1.8698	0 15 58.9	13.314	22	0 40 39.35	1.8657	9 57 10.5	11.966
23	23 13 28.70	1.8681	S. 0 2 40.4	13.303	23	0 42 31.34	1.8673	N. 10 9 7.1	11.929
SATURDAY 22.					MONDAY 24.				
0	23 15 20.73	1.8664	N. 0 10 37.4	13.291	0	0 44 23.41	1.8686	N. 10 21 1.1	11.877
1	23 17 12.67	1.8649	0 23 54.5	13.278	1	0 46 15.57	1.8709	10 32 52.3	11.830
2	23 19 4.52	1.8635	0 37 10.8	13.264	2	0 48 7.83	1.8718	10 44 40.7	11.789
3	23 20 56.29	1.8621	0 50 26.2	13.249	3	0 50 0.19	1.8735	10 56 26.2	11.735
4	23 22 47.97	1.8607	1 3 40.7	13.234	4	0 51 52.65	1.8759	11 8 8.9	11.687
5	23 24 39.57	1.8594	1 16 54.3	13.219	5	0 53 45.21	1.8780	11 19 48.6	11.638
6	23 26 31.10	1.8583	1 30 7.0	13.209	6	0 55 37.88	1.8787	11 31 25.4	11.588
7	23 28 22.56	1.8573	1 43 18.6	13.185	7	0 57 30.66	1.8806	11 42 59.2	11.537
8	23 30 13.96	1.8561	1 56 29.2	13.167	8	0 59 23.55	1.8825	11 54 29.9	11.486
9	23 32 5.29	1.8551	2 9 38.7	13.148	9	1 1 16.56	1.8845	12 5 57.5	11.434
10	23 33 56.57	1.8549	2 22 47.0	13.128	10	1 3 9.69	1.8865	12 17 22.0	11.382
11	23 35 47.80	1.8534	2 35 54.1	13.106	11	1 5 2.94	1.8894	12 28 43.3	11.326
12	23 37 38.98	1.8527	2 49 0.0	13.087	12	1 6 56.30	1.8904	12 40 1.3	11.273
13	23 39 30.12	1.8520	3 2 4.6	13.066	13	1 8 49.79	1.8926	12 51 16.1	11.219
14	23 41 21.22	1.8513	3 15 7.9	13.044	14	1 10 43.42	1.8949	13 2 27.6	11.164
15	23 43 12.28	1.8507	3 28 9.9	13.022	15	1 12 37.18	1.8973	13 13 35.8	11.106
16	23 45 3.31	1.8503	3 41 10.5	12.998	16	1 14 31.08	1.8994	13 24 40.6	11.051
17	23 46 54.31	1.8498	3 54 9.6	12.973	17	1 16 25.11	1.9017	13 35 41.9	10.993
18	23 48 45.29	1.8495	4 7 7.2	12.948	18	1 18 19.28	1.9041	13 46 39.8	10.936
19	23 50 36.25	1.8493	4 20 3.3	12.923	19	1 20 13.60	1.9065	13 57 34.2	10.877
20	23 52 27.30	1.8491	4 32 57.9	12.896	20	1 22 8.66	1.9088	14 8 25.0	10.817
21	23 54 18.14	1.8489	4 45 50.8	12.868	21	1 24 2.66	1.9119	14 19 12.2	10.757
22	23 56 9.07	1.8488	4 58 42.0	12.840	22	1 25 57.41	1.9138	14 29 55.8	10.696
23	23 58 0.00	1.8487	5 11 31.6	12.813	23	1 27 52.32	1.9164	14 40 35.7	10.633
24	23 59 50.92	1.8487	N. 5 24 19.5	12.783	24	1 29 47.38	1.9190	N. 14 51 11.8	10.571

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 25.					THURSDAY 27.				
0	1 <sup>h</sup> 29 <sup>m</sup> 47.38 <sup>s</sup>	1.9190	N.14° 51' 11.8"	10.571	0	3 <sup>h</sup> 5 <sup>m</sup> 23.46 <sup>s</sup>	2.0897	N.21° 52' 51.4"	6.729
1	1 31 42.60	1.9217	15 1 44.2	10.508	1	3 7 27.74	2.0799	21 59 31.8	6.693
2	1 33 37.98	1.9243	15 12 12.8	10.444	2	3 9 32.21	2.0702	22 6 6.2	6.584
3	1 35 33.51	1.9269	15 22 37.5	10.379	3	3 11 36.88	2.0794	22 12 34.7	6.495
4	1 37 29.21	1.9297	15 32 58.3	10.313	4	3 13 41.74	2.0885	22 18 57.3	6.387
5	1 39 25.08	1.9326	15 43 15.1	10.248	5	3 15 46.78	2.0857	22 25 13.9	6.298
6	1 41 21.12	1.9354	15 53 28.0	10.183	6	3 17 52.02	2.0899	22 31 24.4	6.195
7	1 43 17.32	1.9389	16 3 36.9	10.114	7	3 19 57.45	2.0990	22 37 28.9	6.094
8	1 45 13.70	1.9411	16 13 41.7	10.045	8	3 22 3.06	2.0951	22 43 27.3	5.993
9	1 47 10.25	1.9439	16 23 42.3	9.975	9	3 24 8.86	2.0993	22 49 19.5	5.818
10	1 49 6.97	1.9468	16 33 38.7	9.906	10	3 26 14.84	2.1019	22 55 5.5	5.715
11	1 51 3.87	1.9497	16 43 31.0	9.837	11	3 28 21.01	2.1043	23 0 45.3	5.619
12	1 53 0.94	1.9527	16 53 19.1	9.768	12	3 30 27.36	2.1073	23 6 18.9	5.507
13	1 54 58.19	1.9558	17 3 2.9	9.693	13	3 32 33.89	2.1103	23 11 46.2	5.402
14	1 56 55.63	1.9588	17 12 42.3	9.620	14	3 34 40.60	2.1138	23 17 7.1	5.296
15	1 58 53.25	1.9618	17 22 17.3	9.547	15	3 36 47.48	2.1161	23 22 21.7	5.190
16	2 0 51.05	1.9649	17 31 47.9	9.473	16	3 38 54.53	2.1190	23 27 29.9	5.083
17	2 2 49.04	1.9681	17 41 14.0	9.398	17	3 41 1.76	2.1219	23 32 31.6	4.975
18	2 4 47.22	1.9713	17 50 35.7	9.323	18	3 43 9.16	2.1247	23 37 26.9	4.867
19	2 6 45.59	1.9744	17 59 52.8	9.247	19	3 45 16.73	2.1275	23 42 15.7	4.758
20	2 8 44.15	1.9775	18 9 5.3	9.169	20	3 47 24.46	2.1309	23 46 57.9	4.648
21	2 10 42.89	1.9806	18 18 13.1	9.091	21	3 49 32.36	2.1330	23 51 33.5	4.536
22	2 12 41.82	1.9838	18 27 16.2	9.013	22	3 51 40.42	2.1357	23 56 2.5	4.428
23	2 14 40.95	1.9871	N.18 36 14.7	8.935	23	3 53 48.64	2.1383	N.24 0 24.9	4.318
WEDNESDAY 26.					FRIDAY 28.				
0	2 16 40.28	1.9904	N.18 45 8.4	8.854	0	3 55 57.01	2.1408	N.24 4 40.7	4.207
1	2 18 39.80	1.9937	18 53 57.2	8.773	1	3 58 5.54	2.1434	24 8 49.7	4.094
2	2 20 39.52	1.9969	19 2 41.2	8.692	2	4 0 14.22	2.1458	24 12 52.0	3.980
3	2 22 39.43	2.0002	19 11 20.3	8.611	3	4 2 23.04	2.1489	24 16 47.6	3.870
4	2 24 39.54	2.0034	19 19 54.5	8.527	4	4 4 32.01	2.1507	24 20 36.4	3.756
5	2 26 39.84	2.0067	19 28 23.6	8.443	5	4 6 41.12	2.1531	24 24 18.3	3.648
6	2 28 40.34	2.0100	19 36 47.6	8.359	6	4 8 50.38	2.1555	24 27 53.4	3.537
7	2 30 41.04	2.0133	19 45 6.7	8.274	7	4 10 59.78	2.1577	24 31 21.6	3.419
8	2 32 41.94	2.0167	19 53 20.6	8.188	8	4 13 9.30	2.1598	24 34 42.9	3.298
9	2 34 43.04	2.0200	20 1 29.3	8.102	9	4 15 18.95	2.1619	24 37 57.4	3.183
10	2 36 44.34	2.0233	20 9 32.8	8.015	10	4 17 28.73	2.1641	24 41 4.9	3.067
11	2 38 45.84	2.0266	20 17 31.1	7.927	11	4 19 38.64	2.1669	24 44 5.4	2.950
12	2 40 47.53	2.0299	20 25 24.1	7.838	12	4 21 48.67	2.1689	24 46 58.9	2.833
13	2 42 49.43	2.0333	20 33 11.7	7.748	13	4 23 58.82	2.1701	24 49 45.4	2.716
14	2 44 51.53	2.0367	20 40 53.9	7.659	14	4 26 9.08	2.1790	24 52 24.8	2.598
15	2 46 53.83	2.0400	20 48 30.8	7.569	15	4 28 19.46	2.1738	24 54 57.2	2.481
16	2 48 56.33	2.0433	20 56 2.2	7.477	16	4 30 29.94	2.1756	24 57 22.5	2.363
17	2 50 59.02	2.0466	21 3 28.1	7.385	17	4 32 40.53	2.1773	24 59 40.7	2.244
18	2 53 1.92	2.0500	21 10 48.4	7.293	18	4 34 51.22	2.1790	25 1 51.8	2.135
19	2 55 5.02	2.0532	21 18 3.1	7.198	19	4 37 2.01	2.1806	25 3 55.7	2.005
20	2 57 8.31	2.0565	21 25 12.2	7.104	20	4 39 12.89	2.1822	25 5 52.4	1.886
21	2 59 11.80	2.0598	21 32 15.6	7.009	21	4 41 23.87	2.1837	25 7 42.0	1.767
22	3 1 15.49	2.0632	21 39 13.3	6.913	22	4 43 34.93	2.1850	25 9 24.4	1.647
23	3 3 19.38	2.0664	21 46 5.2	6.818	23	4 45 46.07	2.1864	25 10 59.6	1.528
24	3 5 23.46	2.0697	N.21 52 51.4	6.729	24	4 47 57.30	2.1877	N.25 12 27.5	1.405

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 29.					SUNDAY 30.				
0	<sup>h</sup> 4 <sup>m</sup> 47 <sup>s</sup> 57.30	2.1877	N.25° 12' 27.5"	1.406	0	<sup>h</sup> 5 <sup>m</sup> 40 <sup>s</sup> 40.61	2.1906	N.25° 11' 2.6"	1.531
1	4 50 8.60	2.1889	25 13 48.2	1.384	1	5 42 52.57	2.1908	25 9 27.1	1.684
2	4 52 19.97	2.1901	25 15 1.6	1.163	2	5 45 4.51	2.1908	25 7 44.2	1.777
3	4 54 31.41	2.1912	25 16 7.8	1.042	3	5 47 16.43	2.1904	25 5 53.9	1.899
4	4 56 42.92	2.1923	25 17 6.7	0.921	4	5 49 28.32	2.1978	25 3 56.3	2.021
5	4 58 54.49	2.1933	25 17 58.3	0.799	5	5 51 40.17	2.1973	25 1 51.4	2.142
6	5 1 6.11	2.1949	25 18 42.6	0.677	6	5 53 51.99	2.1967	24 59 39.2	2.264
7	5 3 17.79	2.1960	25 19 19.6	0.555	7	5 56 3.77	2.1959	24 57 19.7	2.386
8	5 5 29.51	2.1968	25 19 49.2	0.432	8	5 58 15.50	2.1950	24 54 52.9	2.508
9	5 7 41.28	2.1965	25 20 11.5	0.310	9	6 0 27.19	2.1944	24 52 18.7	2.631
10	5 9 53.09	2.1979	25 20 26.4	0.188	10	6 2 38.83	2.1936	24 49 37.2	2.759
11	5 12 4.94	2.1978	25 20 34.0	+0.066	11	6 4 50.41	2.1926	24 46 48.5	2.879
12	5 14 16.83	2.1963	25 20 34.3	-0.067	12	6 7 1.93	2.1915	24 43 52.6	2.999
13	5 16 28.74	2.1968	25 20 27.2	0.180	13	6 9 13.39	2.1905	24 40 49.4	3.113
14	5 18 40.68	2.1992	25 20 12.7	0.302	14	6 11 24.79	2.1894	24 37 39.0	3.234
15	5 20 52.64	2.1986	25 19 50.9	0.425	15	6 13 36.12	2.1883	24 34 21.3	3.355
16	5 23 4.62	2.1997	25 19 21.7	0.548	16	6 15 47.38	2.1871	24 30 56.4	3.474
17	5 25 16.61	2.1999	25 18 45.1	0.672	17	6 17 58.57	2.1858	24 27 24.4	3.593
18	5 27 28.61	2.2001	25 18 1.1	0.794	18	6 20 9.68	2.1846	24 23 45.2	3.712
19	5 29 40.62	2.2002	25 17 9.8	0.917	19	6 22 20.71	2.1830	24 19 58.9	3.830
20	5 31 52.63	2.2002	25 16 11.1	1.040	20	6 24 31.66	2.1818	24 16 5.4	3.951
21	5 34 4.64	2.2001	25 15 5.0	1.162	21	6 26 42.52	2.1803	24 12 4.8	4.069
22	5 36 16.64	2.1999	25 13 51.6	1.285	22	6 28 53.29	2.1788	24 7 57.1	4.187
23	5 38 28.63	2.1997	25 12 30.8	1.408	23	6 31 3.97	2.1779	24 3 42.4	4.304
24	5 40 40.61	2.1995	N.25 11 2.6	1.531	24	6 33 14.55	2.1756	N.23 59 20.6	4.421

PHASES OF THE MOON.

☾ Last Quarter,	d	<sup>h</sup>	<sup>m</sup>
● New Moon,	6	17	55.4
☾ First Quarter,	13	12	38.7
○ Full Moon,	20	6	54.9
	28	8	57.5

☾ Perigee,	d	<sup>h</sup>
☾ Apogee,	13	16.0
	27	8.4

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Jupiter W.	92° 6' 59"	3094	93° 35' 16"	3094	95° 3' 33"	3093	96° 31' 51"	3092
	α Pegasi W.	72 54 16	3336	74 19 43	3339	75 45 14	3330	77 10 48	3326
	Saturn W.	54 50 6	3109	56 18 5	3106	57 46 7	3104	59 14 12	3101
	α Arietis W.	29 25 14	3145	30 52 29	3138	32 19 52	3133	33 47 22	3127
	Pollux E.	46 34 35	3138	45 7 11	3140	43 39 50	3143	42 12 32	3145
	Regulus E.	83 14 44	3083	81 46 14	3083	80 17 44	3082	78 49 13	3081
2	Saturn W.	66 35 30	3086	68 3 57	3082	69 32 29	3078	71 1 6	3074
	α Arietis W.	41 6 29	3109	42 34 36	3097	44 2 49	3099	45 31 8	3087
	Mars W.	23 6 51	3095	24 36 33	3019	26 6 31	3001	27 36 43	9991
	Pollux E.	34 57 3	3166	33 30 13	3179	32 3 30	3178	30 36 55	3167
	Regulus E.	71 26 11	3073	69 57 28	3070	68 28 42	3067	66 59 52	3064
	Venus E.	101 38 52	3268	100 14 27	3267	98 50 0	3264	97 25 30	3262
3	Saturn W.	78 25 27	3050	79 54 38	3045	81 23 55	3039	82 53 19	3033
	α Arietis W.	52 54 23	3069	54 23 23	3053	55 52 30	3047	57 21 45	3039
	Mars W.	35 10 38	2947	36 41 57	2939	38 13 26	2931	39 45 6	2923
	Aldebaran W.	21 39 8	3407	23 1 17	3358	24 24 22	3316	25 48 15	3280
	Regulus E.	59 34 39	3044	58 5 21	3040	56 35 58	3034	55 6 28	3030
	Venus E.	90 22 16	3267	88 57 26	3263	87 32 31	3258	86 7 30	3253
	SUN E.	132 6 39	3439	130 45 7	3433	129 23 28	3427	128 1 42	3420
4	α Arietis W.	64 50 15	3001	66 20 26	2993	67 50 48	2984	69 21 21	2975
	Mars W.	47 26 4	2979	48 58 50	2970	50 31 47	2961	52 4 56	2952
	Aldebaran W.	32 56 49	3148	34 24 0	3128	35 51 36	3109	37 19 35	3090
	Regulus E.	47 37 12	2997	46 6 56	2991	44 36 32	2984	43 5 59	2976
	Venus E.	79 0 52	3294	77 35 11	3216	76 9 21	3209	74 43 22	3201
	SUN E.	121 10 38	3378	119 47 56	3368	118 25 3	3359	117 1 59	3349
5	Mars W.	59 53 57	2798	61 28 28	2786	63 3 14	2775	64 38 15	2763
	Aldebaran W.	44 44 58	3005	46 15 4	2989	47 45 30	2973	49 16 17	2957
	Regulus E.	35 30 41	2934	33 59 5	2925	32 27 18	2917	30 55 21	2908
	Venus E.	67 30 59	3156	66 3 57	3146	64 36 43	3135	63 9 16	3124
	Spica E.	89 29 13	2911	87 57 8	2900	86 24 49	2889	84 52 16	2877
	SUN E.	110 3 36	3299	108 39 15	3280	107 14 40	3267	105 49 50	3253
6	Mars W.	72 37 32	2997	74 14 16	2983	75 51 19	2968	77 28 42	2952
	Aldebaran W.	56 55 13	2978	58 28 2	2959	60 1 13	2943	61 34 45	2927
	Venus E.	55 48 36	3065	54 19 43	3052	52 50 35	3039	51 21 11	3026
	Spica E.	77 5 31	2912	75 31 19	2798	73 56 49	2784	72 22 0	2769
	SUN E.	98 41 37	3182	97 15 6	3167	95 48 17	3151	94 21 9	3134
7	Mars W.	85 40 46	2575	87 20 15	2559	89 0 7	2543	90 40 21	2526
	Aldebaran W.	69 27 54	2741	71 3 40	2722	72 39 50	2704	74 16 24	2687
	Pollux W.	27 41 52	2929	29 15 42	2799	30 50 11	2770	32 25 18	2742
	Venus E.	43 49 53	2955	42 18 44	2941	40 47 17	2927	39 15 32	2912
	Spica E.	64 22 54	2991	62 46 2	2975	61 8 48	2958	59 31 12	2941
	SUN E.	87 0 26	3049	85 31 14	3031	84 1 39	3013	82 31 42	2993
8	Aldebaran W.	82 25 21	2594	84 4 24	2578	85 43 52	2557	87 23 46	2538
	Pollux W.	40 29 36	2618	42 8 6	2596	43 47 7	2573	45 26 39	2551
	Venus E.	31 32 17	2944	29 58 46	2933	28 25 1	2922	26 51 2	2912
	Spica E.	51 17 20	2554	49 37 22	2535	47 56 58	2517	46 16 9	2499

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dif.	XVh.	P. L. of Dif.	XVIIIh.	P. L. of Dif.	XXIh.	P. L. of Dif.
1	Jupiter W.	98 0 11	3091	99 28 32	3090	100 56 54	3088	102 25 18	3087
	α Pegasi W.	78 36 26	3093	80 2 8	3090	81 27 53	3217	82 53 42	3214
	Saturn W.	60 42 21	3099	62 10 33	3096	63 38 48	3099	65 7 7	3099
	α Arietis W.	35 14 59	3129	36 42 42	3116	38 10 32	3111	39 38 28	3107
	Pollux E.	40 45 17	3148	39 18 6	3153	37 51 0	3157	36 23 59	3161
	Regulus E.	77 20 40	3090	75 52 6	3078	74 23 30	3077	72 54 52	3074
2	Saturn W.	72 29 47	3070	73 58 33	3065	75 27 25	3061	76 56 23	3066
	α Arietis W.	46 59 34	3089	48 28 0	3076	49 56 45	3070	51 25 31	3065
	Mars W.	29 7 7	3261	30 37 43	3279	32 8 31	3264	33 39 29	3265
	Pollux E.	29 10 30	3197	27 44 17	3207	26 18 16	3220	24 52 31	3237
	Regulus E.	65 30 58	3040	64 2 0	3057	62 32 58	3053	61 3 51	3049
	Venus E.	96 0 57	3290	94 36 22	3277	93 11 44	3274	91 47 2	3270
3	Saturn W.	84 22 51	3087	85 52 30	3081	87 22 17	3014	88 52 13	3005
	α Arietis W.	58 51 9	3039	60 20 42	3025	61 50 24	3018	63 20 15	3010
	Mars W.	41 16 50	3214	42 48 57	3208	44 21 8	3209	45 53 30	3208
	Aldebaran W.	27 12 50	3248	28 38 2	3220	30 3 48	3194	31 30 4	3170
	Regulus E.	53 36 52	3094	52 7 9	3018	50 37 18	3011	49 7 19	3005
	Venus E.	84 42 23	3247	83 17 10	3242	81 51 51	3236	80 26 25	3231
	Sun E.	126 39 48	3412	125 17 45	3403	123 55 32	3395	122 33 10	3388
4	α Arietis W.	70 52 5	3265	72 23 1	3255	73 54 10	3245	75 25 32	3235
	Mars W.	53 38 17	3242	55 11 51	3231	56 45 39	3220	58 19 41	3209
	Aldebaran W.	38 47 57	3279	40 16 41	3265	41 45 46	3238	43 15 12	3222
	Regulus E.	41 35 16	3268	40 4 23	3260	38 33 20	3261	37 2 6	3249
	Venus E.	73 17 14	3193	71 50 56	3184	70 24 28	3175	68 57 49	3168
	Sun E.	115 38 44	3338	114 15 17	3327	112 51 37	3315	111 27 43	3304
5	Mars W.	66 13 32	3270	67 49 6	3277	69 24 57	3223	71 1 6	3210
	Aldebaran W.	50 47 24	3241	52 18 51	3225	53 50 38	3209	55 22 45	3203
	Regulus E.	29 23 12	3299	27 50 52	3291	26 18 22	3283	24 45 42	3277
	Venus E.	61 41 36	3114	60 13 43	3108	58 45 36	3090	57 17 14	3077
	Spica E.	83 19 28	3264	81 46 23	3259	80 13 2	3239	78 39 25	3226
	Sun E.	104 24 44	3241	102 59 23	3226	101 33 45	3212	100 7 50	3197
6	Mars W.	79 6 26	3238	80 44 30	3223	82 22 54	3207	84 1 39	3201
	Aldebaran W.	63 8 38	3210	64 42 53	3202	66 17 31	3275	67 52 31	3258
	Venus E.	49 51 30	3212	48 21 32	3206	46 51 17	3204	45 20 44	3200
	Spica E.	70 46 51	3253	69 11 22	3238	67 35 33	3233	65 59 24	3207
	Sun E.	92 53 41	3118	91 25 53	3101	89 57 45	3084	88 29 16	3067
7	Mars W.	92 20 59	3208	94 2 1	3491	95 43 27	3474	97 25 17	3455
	Aldebaran W.	75 53 22	3268	77 30 45	3250	79 8 32	3232	80 46 44	3213
	Pollux W.	34 1 2	3216	35 37 21	3201	37 14 13	3206	38 51 38	3242
	Venus E.	37 43 20	3296	36 11 8	3284	34 38 29	3270	33 5 32	3256
	Spica E.	57 53 13	3294	56 14 50	3207	54 36 4	3239	52 56 54	3272
	Sun E.	81 1 21	3274	79 30 36	3266	77 59 28	3237	76 27 56	3218
8	Aldebaran W.	89 4 6	3290	90 44 52	3261	92 26 4	3482	94 7 42	3463
	Pollux W.	47 6 42	3228	48 47 16	3207	50 28 20	3485	52 9 54	3464
	Venus E.	25 16 50	3205	23 42 28	3200	22 8 0	3298	20 33 30	3201
	Spica E.	44 34 55	3489	42 53 16	3464	41 11 12	3446	39 28 43	3439

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
8	SUN	E.	74° 56' 0"	2886	73° 23' 39"	2878	71° 50' 52"	2859	70° 17' 40"	2838
9	Pollux	W.	53 51 58	2443	55 34 32	2422	57 17 35	2401	59 1 8	2381
	Spica	E.	37 45 49	2411	36 2 30	2394	34 18 46	2376	32 34 37	2359
	SUN	E.	62 25 10	2739	60 49 22	2719	59 13 7	2699	57 36 26	2680
10	Pollux	W.	67 46 1	2284	69 32 24	2266	71 19 14	2248	73 6 30	2231
	Regulus	W.	30 44 9	2281	32 30 36	2260	34 17 34	2240	36 5 2	2221
	SUN	E.	49 26 33	2565	47 47 18	2568	46 7 39	2551	44 27 37	2534
11	Pollux	W.	82 9 12	2149	83 58 56	2136	85 49 2	2120	87 39 30	2107
	Regulus	W.	45 9 12	2134	46 59 19	2119	48 49 49	2104	50 40 42	2090
	SUN	E.	36 1 50	2460	34 19 40	2448	32 37 13	2437	30 54 31	2427
15	SUN	W.	21 10 11	2389	22 54 2	2387	24 37 56	2388	26 21 48	2392
	Fomalhaut	E.	78 10 24	2444	76 27 52	2460	74 45 43	2478	73 3 59	2496
	Jupiter	E.	79 30 53	2037	77 38 17	2047	75 45 56	2057	73 53 51	2068
	α Pegasi	E.	98 30 43	2153	96 41 4	2161	94 51 37	2169	93 2 23	2179
16	SUN	W.	34 58 52	2436	36 41 35	2449	38 24 0	2463	40 6 6	2477
	Jupiter	E.	64 38 3	2134	62 47 56	2149	60 58 11	2165	59 8 50	2180
	Fomalhaut	E.	64 43 7	2696	63 4 48	2658	61 27 12	2692	59 50 22	2739
	α Pegasi	E.	84 0 29	2244	82 13 7	2259	80 26 7	2275	78 39 31	2292
17	SUN	W.	48 31 21	2556	50 11 16	2574	51 50 46	2593	53 29 51	2610
	Jupiter	E.	50 8 23	2370	48 21 39	2388	46 35 22	2397	44 49 33	2397
	Fomalhaut	E.	51 59 30	2268	50 28 24	2314	48 58 29	2376	47 29 50	2448
	α Pegasi	E.	69 53 6	2389	68 9 15	2410	66 25 54	2432	64 43 5	2455
	Saturn	E.	86 11 8	2248	84 23 52	2265	82 37 1	2283	80 50 37	2301
18	SUN	W.	61 39 1	2705	63 15 34	2725	64 51 41	2744	66 27 22	2764
	Jupiter	E.	36 7 59	2435	34 25 14	2458	32 43 2	2482	31 1 24	2507
	α Pegasi	E.	56 17 27	2582	54 38 7	2610	52 59 26	2639	51 21 24	2668
	Saturn	E.	72 5 20	2396	70 21 39	2415	68 38 26	2435	66 55 41	2454
19	SUN	W.	74 19 21	2892	75 52 29	2881	77 25 12	2890	78 57 31	2919
	α Pegasi	E.	43 21 56	2843	41 48 23	2883	40 15 42	2906	38 43 56	2973
	Saturn	E.	58 28 53	2555	56 48 56	2574	55 9 26	2595	53 30 24	2615
	α Arietis	E.	84 34 23	2529	82 53 50	2547	81 13 42	2565	79 33 59	2583
	Mars	E.	96 36 59	2415	94 53 46	2433	93 10 59	2452	91 28 38	2470
20	SUN	W.	86 33 9	3019	88 3 7	3029	89 32 44	3046	91 2 0	3063
	Saturn	E.	45 22 13	2719	43 45 58	2741	42 10 12	2763	40 34 55	2785
	α Arietis	E.	71 21 27	2670	69 44 7	2687	68 7 9	2703	66 30 33	2719
	Mars	E.	83 2 56	2554	81 22 58	2570	79 43 22	2586	78 4 8	2602
21	SUN	W.	98 23 12	3144	99 50 28	3159	101 17 26	3173	102 44 7	3188
	α Aquilæ	W.	43 21 31	4104	44 31 29	4044	45 42 25	3991	46 54 13	3944
	α Arietis	E.	58 32 52	2798	56 58 21	2812	55 24 9	2827	53 50 16	2841
	Mars	E.	69 53 17	2678	68 16 8	2699	66 39 17	2705	65 2 44	2719
	Aldebaran	E.	91 14 38	2693	89 40 40	2638	88 7 1	2651	86 33 39	2604
22	SUN	W.	109 53 20	3265	111 18 24	3267	112 43 14	3279	114 7 50	3290

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
8	SUN	E.	68 44' 2"	2816	67 9' 58"	2798	65 35' 28"	2779	64 0' 32"	2759
9	Pollux	W.	60 45 10	2302	62 29 40	2342	64 14 39	2382	66 0 6	2303
	Spica	E.	30 50 4	2344	29 5 8	2386	27 19 49	2313	25 34 8	2300
	SUN	E.	55 59 19	2660	54 21 46	2641	52 43 47	2623	51 5 23	2604
10	Pollux	W.	74 54 12	2213	76 42 20	2196	78 30 53	2180	80 19 51	2165
	Regulus	W.	37 52 58	2262	39 41 22	2184	41 30 13	2167	43 19 30	2151
	SUN	E.	42 47 11	2517	41 6 22	2509	39 25 12	2487	37 43 41	2473
11	Pollux	W.	89 30 18	2094	91 21 26	2063	93 12 52	2071	95 4 36	2080
	Regulus	W.	52 31 57	2076	54 23 33	2064	56 15 28	2052	58 7 42	2040
	SUN	E.	29 11 35	2419	27 26 27	2412	25 45 9	2407	24 1 44	2405
15	SUN	W.	28 5 34	2306	29 49 12	2405	31 32 39	2414	33 15 53	2425
	Fomalhaut	E.	71 22 43	2520	69 41 58	2543	68 1 45	2569	66 22 7	2526
	Jupiter	E.	72 2 3	2050	70 10 33	2092	68 19 22	2106	66 28 32	2120
	α Pegasi	E.	91 13 24	2190	89 24 42	2202	87 36 18	2215	85 48 13	2229
16	SUN	W.	41 47 52	2491	43 29 18	2507	45 10 22	2523	46 51 3	2540
	Jupiter	E.	57 19 53	2197	55 31 21	2214	53 43 15	2229	51 55 35	2251
	Fomalhaut	E.	58 14 21	2760	56 39 12	2811	55 4 58	2856	53 31 43	2905
	α Pegasi	E.	76 53 20	2310	75 7 35	2328	73 22 17	2348	71 37 27	2368
17	SUN	W.	55 8 32	2629	56 46 48	2648	58 24 38	2667	60 2 2	2686
	Jupiter	E.	43 4 13	2348	41 19 23	2369	39 35 4	2391	37 51 16	2412
	Fomalhaut	E.	46 2 31	2814	44 36 38	2862	43 12 17	2877	41 49 34	2870
	α Pegasi	E.	63 0 49	2479	61 19 6	2503	59 37 57	2529	57 57 24	2555
	Saturn	E.	79 4 39	2320	77 19 8	2339	75 34 5	2357	73 49 29	2376
18	SUN	W.	68 2 37	2784	69 37 26	2803	71 11 50	2823	72 45 48	2842
	Jupiter	E.	29 20 21	2533	27 39 54	2561	26 0 5	2591	24 20 57	2622
	α Pegasi	E.	49 44 3	2701	48 7 24	2734	46 31 29	2768	44 56 19	2804
	Saturn	E.	65 13 23	2474	63 31 33	2494	61 50 11	2515	60 9 18	2535
19	SUN	W.	80 29 26	2928	82 0 57	2957	83 32 4	2975	85 2 48	2993
	α Pegasi	E.	37 13 9	2029	35 43 24	2076	34 14 45	2125	32 47 18	2160
	Saturn	E.	51 51 50	2636	50 13 44	2657	48 36 6	2678	46 58 56	2698
	α Arietis	E.	77 54 41	2601	76 15 47	2618	74 37 17	2635	72 59 10	2653
	Mars	E.	89 46 42	2487	88 5 10	2504	86 24 2	2520	84 43 17	2538
20	SUN	W.	92 30 55	3080	93 59 29	3096	95 27 43	3113	96 55 37	3129
	Saturn	E.	30 0 7	2608	37 25 49	2631	35 52 1	2654	34 18 43	2679
	α Arietis	E.	64 54 19	2735	63 18 26	2751	61 42 54	2767	60 7 43	2782
	Mars	E.	76 25 16	2618	74 46 45	2633	73 8 35	2649	71 30 46	2663
21	SUN	W.	104 10 30	2903	105 36 36	2916	107 2 26	2929	108 28 1	2942
	α Aquilæ	W.	48 6 48	2602	49 20 6	2605	50 34 1	2609	51 48 30	2602
	α Arietis	E.	52 16 41	2855	50 43 24	2869	49 10 25	2883	47 37 44	2896
	Mars	E.	63 26 29	2732	61 50 32	2745	60 14 52	2758	58 39 29	2770
	Aldebaran	E.	85 0 34	2877	83 27 46	2890	81 55 14	2903	80 22 59	2915
22	SUN	W.	115 32 13	3301	116 56 23	3312	118 20 20	3322	119 44 6	3332



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
22	$\alpha$ Aquilæ W.	53° 3' 30"	3776	54° 18' 57"	3752	55° 34' 49"	3731	56° 51' 3"	3713
	$\alpha$ Arietis E.	46 5 20	2909	44 33 12	2922	43 1 21	2935	41 29 46	2948
	Mars E.	57 4 22	2789	55 29 31	2794	53 54 55	2805	52 20 34	2816
	Aldebaran E.	78 50 59	2927	77 19 15	2939	75 47 45	2950	74 16 30	2961
23	Sun W.	121 7 40	3342	122 31 3	3351	123 54 15	3360	125 17 17	3369
	$\alpha$ Aquilæ W.	63 16 27	3647	64 34 11	3637	65 52 5	3630	67 10 7	3623
	Jupiter W.	28 52 8	3052	30 21 16	3054	31 50 22	3057	33 19 24	3060
	Mars E.	44 32 18	2868	42 59 18	2878	41 26 31	2887	39 53 55	2896
	Aldebaran E.	66 43 37	3014	65 13 41	3023	63 43 57	3032	62 14 24	3042
24	$\alpha$ Aquilæ W.	73 41 56	3508	75 0 32	3508	76 19 11	3505	77 37 51	3503
	Fomalhaut W.	48 54 11	3793	50 9 20	3765	51 24 59	3740	52 41 4	3716
	Jupiter W.	40 43 28	3079	42 12 3	3089	43 40 34	3087	45 9 0	3090
	Mars E.	32 13 49	2941	30 42 22	2950	29 11 6	2959	27 40 2	2968
	Aldebaran E.	54 49 30	3087	53 21 4	3095	51 52 48	3104	50 24 43	3112
25	Fomalhaut W.	59 6 58	3627	60 25 3	3614	61 43 22	3601	63 1 55	3590
	Jupiter W.	52 30 11	3105	53 58 15	3108	55 26 15	3110	56 54 12	3112
	$\alpha$ Pegasi W.	36 28 4	3471	37 49 1	3446	39 10 26	3494	40 32 15	3498
	Aldebaran E.	43 6 55	3158	41 39 55	3167	40 13 6	3178	38 46 30	3186
	Pollux E.	84 46 23	3080	83 17 49	3084	81 49 20	3087	80 20 55	3090
26	Fomalhaut W.	69 37 27	3545	70 57 2	3538	72 16 44	3531	73 36 34	3525
	Jupiter W.	64 13 25	3190	65 41 10	3191	67 8 54	3192	68 36 37	3193
	$\alpha$ Pegasi W.	47 26 4	3335	48 49 35	3324	50 13 19	3314	51 37 14	3306
	Saturn W.	29 52 30	3213	31 18 24	3202	32 44 31	3192	34 10 50	3183
	Pollux E.	72 59 40	3103	71 31 34	3105	70 3 30	3106	68 35 28	3108
27	Fomalhaut W.	80 17 10	3508	81 37 32	3499	82 57 57	3496	84 18 26	3493
	Jupiter W.	75 55 2	3194	77 22 42	3194	78 50 23	3194	80 18 4	3193
	$\alpha$ Pegasi W.	58 39 11	3269	60 3 59	3264	61 28 53	3258	62 53 54	3252
	Saturn W.	41 24 42	3151	42 51 50	3146	44 19 4	3148	45 46 23	3137
	Pollux E.	61 15 51	3116	59 48 1	3117	58 20 12	3118	56 52 24	3119
28	Fomalhaut W.	91 1 26	3486	92 22 6	3485	93 42 47	3485	95 3 28	3485
	Jupiter W.	87 36 43	3119	89 4 30	3117	90 32 19	3115	92 0 10	3114
	$\alpha$ Pegasi W.	70 0 31	3298	71 26 7	3294	72 51 48	3290	74 17 34	3285
	Saturn W.	53 4 16	3118	54 32 4	3114	55 59 57	3110	57 27 54	3107
	$\alpha$ Arietis W.	26 27 53	3149	27 55 3	3140	29 22 24	3139	30 49 55	3134
	Pollux E.	49 33 48	3125	48 6 9	3127	46 38 32	3128	45 10 56	3130
	Regulus E.	86 15 49	3075	84 47 9	3074	83 18 28	3073	81 49 45	3071
29	Saturn W.	64 48 43	3089	66 17 6	3085	67 45 34	3089	69 14 6	3078
	$\alpha$ Arietis W.	38 9 37	3063	39 37 55	3068	41 6 19	3069	42 34 50	3078
	Mars W.	28 49 20	3003	30 19 29	2997	31 49 45	2993	33 20 7	2989
	Pollux E.	37 53 38	3143	36 26 21	3148	34 59 9	3153	33 32 3	3158
	Regulus E.	74 25 34	3080	72 56 36	3058	71 27 35	3056	69 58 31	3062
30	Saturn W.	76 37 58	3058	78 6 59	3053	79 36 6	3049	81 5 18	3045
	$\alpha$ Arietis W.	49 58 58	3052	51 28 6	3047	52 57 20	3042	54 26 41	3037
	Mars W.	40 53 20	2965	42 24 16	2962	43 55 17	2957	45 26 24	2953
	Regulus E.	62 32 14	3037	61 2 47	3033	59 33 15	3030	58 3 39	3026

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
22	$\alpha$ Aquilæ W.	58° 7' 36"	3686	59° 24' 27"	3681	60° 41' 34"	3689	61° 58' 54"	3687
	$\alpha$ Arietis E.	39 58 28	2960	38 27 25	2973	36 56 39	2986	35 26 9	2999
	Mars E.	50 46 27	2927	49 12 34	2938	47 38 55	2948	46 5 30	2959
	Aldebaran E.	72 45 28	2972	71 14 40	2963	69 44 6	2993	68 13 45	3004
23	Sun W.	126 40 9	3377	128 2 52	3385	129 25 26	3393	130 47 51	3400
	$\alpha$ Aquilæ W.	68 28 17	3617	69 46 33	3611	71 4 55	3606	72 23 23	3601
	Jupiter W.	34 48 22	3064	36 17 16	3068	37 46 5	3079	39 14 49	3078
	Mars E.	38 21 31	2905	36 49 18	2914	35 17 17	2923	33 45 27	2932
	Aldebaran E.	60 45 3	3051	59 15 53	3060	57 46 55	3069	56 18 7	3078
24	$\alpha$ Aquilæ W.	78 56 33	3592	80 15 16	3591	81 34 0	3590	82 52 45	3590
	Fomalhaut W.	53 57 34	3695	55 14 26	3677	56 31 38	3659	57 49 9	3649
	Jupiter W.	46 37 22	3093	48 5 40	3096	49 33 54	3100	51 2 4	3102
	Mars E.	26 9 9	2978	24 38 29	2989	23 8 3	3001	21 37 51	3014
	Aldebaran E.	48 56 48	3121	47 29 4	3129	46 1 30	3138	44 34 7	3146
25	Fomalhaut W.	64 20 40	3580	65 39 36	3570	66 58 43	3561	68 18 0	3552
	Jupiter W.	58 22 7	3114	59 50 0	3116	61 17 50	3118	62 45 38	3119
	$\alpha$ Pegasi W.	41 54 25	3368	43 16 55	3372	44 39 43	3359	46 2 46	3346
	Aldebaran E.	37 20 7	3000	35 53 58	3014	34 28 5	3027	33 2 28	3043
	Pollux E.	78 52 33	3093	77 24 15	3096	75 56 0	3099	74 27 49	3101
26	Fomalhaut W.	74 56 30	3590	76 16 32	3515	77 36 39	3510	78 56 52	3506
	Jupiter W.	70 4 19	3194	71 32 0	3194	72 59 41	3194	74 27 22	3194
	$\alpha$ Pegasi W.	53 1 19	3297	54 25 34	3299	55 49 58	3292	57 14 31	3276
	Saturn W.	35 37 20	3175	37 3 59	3168	38 30 46	3169	39 57 41	3157
	Pollux E.	67 7 29	3110	65 39 32	3112	64 11 37	3113	62 43 43	3114
27	Fomalhaut W.	85 38 58	3490	86 59 33	3499	88 20 9	3498	89 40 47	3487
	Jupiter W.	81 45 46	3129	83 13 29	3121	84 41 13	3120	86 8 58	3120
	$\alpha$ Pegasi W.	64 19 2	3247	65 44 16	3249	67 9 35	3237	68 35 0	3232
	Saturn W.	47 13 48	3133	48 41 18	3129	50 8 53	3126	51 36 32	3121
	Pollux E.	55 24 38	3120	53 56 53	3122	52 29 10	3123	51 1 28	3124
28	Fomalhaut W.	96 24 9	3485	97 44 50	3487	99 5 29	3488	100 26 6	3490
	Jupiter W.	93 28 3	3112	94 55 58	3110	96 23 55	3108	97 51 55	3106
	$\alpha$ Pegasi W.	75 43 25	3211	77 9 21	3208	78 35 21	3204	80 1 26	3200
	Saturn W.	58 55 55	3104	60 24 0	3100	61 52 10	3096	63 20 24	3092
	$\alpha$ Arietis W.	32 17 36	3117	33 45 25	3110	35 13 22	3106	36 41 26	3099
	Pollux E.	43 43 23	3132	42 15 52	3134	40 48 24	3137	39 20 59	3140
	Regulus E.	80 21 0	3069	78 52 12	3067	77 23 22	3065	75 54 29	3063
29	Saturn W.	70 42 43	3073	72 11 25	3070	73 40 11	3066	75 9 2	3062
	$\alpha$ Arietis W.	44 3 27	3073	45 32 10	3067	47 1 0	3062	48 29 56	3057
	Mars W.	34 50 34	2984	36 21 7	2979	37 51 46	2975	39 22 30	2970
	Pollux E.	32 5 4	3166	30 38 14	3174	29 11 34	3184	27 45 6	3196
	Regulus E.	68 29 23	3049	67 0 11	3047	65 30 56	3043	64 1 37	3040
30	Saturn W.	82 34 35	3040	84 3 58	3035	85 33 27	3030	87 3 2	3025
	$\alpha$ Arietis W.	55 56 8	3031	57 25 42	3026	58 55 22	3021	60 25 9	3014
	Mars W.	46 57 36	2948	48 28 54	2943	50 0 18	2939	51 31 48	2933
	Regulus E.	56 33 59	3022	55 4 14	3018	53 34 24	3014	52 4 28	3009

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.		added to Apparent Time.	
Mon.	1	16 28 59.43	10.793	S. 21° 48' 27.3	-23.41	16 15.96	70.29	10 52.00	0.934
Tues.	2	16 33 18.81	10.821	21 57 37.0	22.36	16 16.11	70.38	10 29.23	0.961
Wed.	3	16 37 38.84	10.847	22 6 21.1	21.31	16 16.25	70.46	10 5.83	0.987
Thur.	4	16 41 59.48	10.872	22 14 39.8	20.24	16 16.38	70.54	9 41.81	1.013
Frid.	5	16 46 20.71	10.896	22 22 32.8	19.16	16 16.51	70.62	9 17.21	1.037
Sat.	6	16 50 42.52	10.920	22 29 59.7	18.06	16 16.64	70.69	8 52.03	1.061
Sun.	7	16 55 4.87	10.942	22 37 0.0	16.95	16 16.76	70.76	8 26.31	1.083
Mon.	8	16 59 27.75	10.963	22 43 33.7	15.84	16 16.88	70.82	8 0.05	1.104
Tues.	9	17 3 51.12	10.982	22 49 40.5	14.72	16 16.99	70.88	7 33.32	1.123
Wed.	10	17 8 14.95	11.001	22 55 20.3	13.59	16 17.10	70.94	7 6.13	1.142
Thur.	11	17 12 39.22	11.018	23 0 33.0	12.46	16 17.20	71.00	6 38.50	1.159
Frid.	12	17 17 3.86	11.034	23 5 18.3	11.32	16 17.31	71.05	6 10.48	1.175
Sat.	13	17 21 28.85	11.048	23 9 36.2	10.17	16 17.41	71.10	5 42.12	1.188
Sun.	14	17 25 54.19	11.062	23 13 26.3	9.01	16 17.51	71.14	5 13.40	1.201
Mon.	15	17 30 19.83	11.073	23 16 48.5	7.84	16 17.60	71.17	4 44.41	1.212
Tues.	16	17 34 45.71	11.083	23 19 42.8	6.67	16 17.69	71.20	4 15.18	1.222
Wed.	17	17 39 11.81	11.091	23 22 9.0	5.50	16 17.77	71.23	3 45.72	1.230
Thur.	18	17 43 38.07	11.098	23 24 7.1	4.33	16 17.85	71.25	3 16.09	1.237
Frid.	19	17 48 4.48	11.102	23 25 36.9	3.16	16 17.93	71.27	2 46.33	1.242
Sat.	20	17 52 30.97	11.106	23 26 38.6	1.98	16 18.00	71.28	2 16.48	1.246
Sun.	21	17 56 57.53	11.107	23 27 12.1	-0.81	16 18.07	71.29	1 46.56	1.247
Mon.	22	18 1 24.12	11.108	23 27 17.3	+0.37	16 18.13	71.30	1 16.61	1.248
Tues.	23	18 5 50.72	11.107	23 26 54.3	1.55	16 18.18	71.30	0 46.64	1.246
Wed.	24	18 10 17.29	11.105	23 26 2.9	2.73	16 18.23	71.30	0 16.70	1.244
Thur.	25	18 14 43.78	11.102	23 24 43.2	3.91	16 18.28	71.29	0 13.14	1.240
Frid.	26	18 19 10.17	11.097	23 22 55.5	5.08	16 18.32	71.28	0 42.89	1.236
Sat.	27	18 23 36.44	11.092	23 20 39.6	6.25	16 18.35	71.26	1 12.52	1.230
Sun.	28	18 28 2.54	11.085	23 17 55.4	7.42	16 18.37	71.24	1 41.98	1.223
Mon.	29	18 32 28.47	11.077	23 14 43.2	8.58	16 18.39	71.21	2 11.27	1.215
Tues.	30	18 36 54.19	11.067	23 11 3.2	9.74	16 18.41	71.18	2 40.36	1.206
Wed.	31	18 41 19.66	11.056	23 6 55.3	10.91	16 18.41	71.15	3 9.19	1.195
Thur.	32	18 45 44.86	11.044	S. 23 2 19.5	+12.07	16 18.41	71.11	3 37.74	1.183

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.19 from the Sidereal Time.

— prefixed to the hourly change of declination indicates that south declinations are increasing;  
+ that they are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to		Diff. for 1 hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	subtracted from Mean Time.			
Mon.	1	<sup>h</sup> 16 <sup>m</sup> 29 <sup>s</sup> 1.37	10.791	S. 21° 48' 31.5	-23.40	<sup>m</sup> 10 <sup>s</sup> 51.83	<sup>s</sup> 0.934	<sup>h</sup> 16 <sup>m</sup> 39 <sup>s</sup> 53.20	
Tues.	2	16 33 20.69	10.818	21 57 40.8	22.35	10 29.06	0.961	16 43 49.75	
Wed.	3	16 37 40.65	10.844	22 6 24.6	21.30	10 5.66	0.987	16 47 46.31	
Thur.	4	16 42 1.22	10.869	22 14 43.0	20.23	9 41.65	1.013	16 51 42.87	
Frid.	5	16 46 22.38	10.893	22 22 35.7	19.15	9 17.05	1.037	16 55 39.43	
Sat.	6	16 50 44.12	10.917	22 30 2.3	18.05	8 51.87	1.061	16 59 35.99	
Sun.	7	16 55 6.39	10.939	22 37 2.3	16.94	8 26.16	1.083	17 3 32.55	
Mon.	8	16 59 29.19	10.960	22 43 35.6	15.83	7 59.91	1.104	17 7 29.10	
Tues.	9	17 3 52.48	10.979	22 49 42.3	14.71	7 33.18	1.123	17 11 25.66	
Wed.	10	17 8 16.23	10.998	22 55 21.9	13.58	7 5.99	1.142	17 15 22.22	
Thur.	11	17 12 40.41	11.015	23 0 34.3	12.45	6 38.37	1.159	17 19 18.78	
Frid.	12	17 17 4.97	11.031	23 5 19.4	11.31	6 10.36	1.175	17 23 15.33	
Sat.	13	17 21 29.88	11.045	23 9 37.1	10.16	5 42.01	1.188	17 27 11.89	
Sun.	14	17 25 55.14	11.059	23 13 27.0	9.00	5 13.31	1.201	17 31 8.45	
Mon.	15	17 30 20.69	11.070	23 16 49.1	7.83	4 44.32	1.212	17 35 5.01	
Tues.	16	17 34 46.48	11.080	23 19 43.2	6.66	4 15.09	1.222	17 39 1.57	
Wed.	17	17 39 12.49	11.087	23 22 9.3	5.50	3 45 64	1.230	17 42 58.13	
Thur.	18	17 43 38.66	11.094	23 24 7.3	4.33	3 16.02	1.237	17 46 54.68	
Frid.	19	17 48 4.97	11.098	23 25 37.1	3.16	2 46.27	1.242	17 50 51.24	
Sat.	20	17 52 31.37	11.102	23 26 35.7	1.98	2 16.43	1.246	17 54 47.80	
Sun.	21	17 56 57.84	11.103	23 27 12.1	- 0.81	1 46.52	1.247	17 58 44.36	
Mon.	22	18 1 24.34	11.104	23 27 17.3	+ 0.37	1 16.58	1.248	18 2 40.92	
Tues.	23	18 5 50.85	11.103	23 26 54.3	1.55	0 46.63	1.246	18 6 37.48	
Wed.	24	18 10 17.33	11.101	23 26 2.9	2.73	0 16.71	1.244	18 10 34.03	
Thur.	25	18 14 43.72	11.098	23 24 43.3	3.91	0 13.13	1.240	18 14 30.59	
Frid.	26	18 19 10.02	11.093	23 22 55.6	5.08	0 42.87	1.236	18 18 27.15	
Sat.	27	18 23 36.20	11.088	23 20 39.7	6.25	1 12.49	1.230	18 22 23.71	
Sun.	28	18 28 2.21	11.081	23 17 55.7	7.42	1 41.94	1.223	18 26 20.27	
Mon.	29	18 32 28.05	11.073	23 14 43.6	8.58	2 11.22	1.215	18 30 16.83	
Tues.	30	18 36 53.68	11.063	23 11 3.7	9.74	2 40.30	1.206	18 34 13.38	
Wed.	31	18 41 19.06	11.052	23 6 55.9	10.90	3 9.12	1.195	18 38 9.94	
Thur.	32	18 45 44.17	11.040	S. 23 2 20.3	+12.06	3 37.67	1.183	18 42 6.50	

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.  
— prefixed to the hourly change of declination indicates that south declinations are increasing;  
+ that they are decreasing.

Diff. for 1 hour.  
+ 9<sup>s</sup>.8565  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal $^{\circ}$ .	
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	335	248 <sup>0</sup> 58' 13.0	57' 11.4	152.09	+0.35	9.9937396	-27.5	<sup>h</sup> 7 <sup>m</sup> 18 <sup>s</sup> 54.70	
2	336	249 59 3.9	58 2.2	152.15	0.22	.9936749	26.5	7 14 58.79	
3	337	250 59 56.1	58 54.2	152.20	+0.09	.9936126	25.5	7 11 2.88	
4	338	251 60 49.6	59 47.5	152.26	-0.04	.9935526	24.5	7 7 6.97	
5	339	253 1 44.5	0 42.2	152.31	0.14	.9934947	23.6	7 3 11.05	
6	340	254 2 40.7	1 38.2	152.37	0.21	.9934389	22.8	6 59 15.14	
7	341	255 3 38.1	2 35.4	152.42	0.26	.9933850	22.0	6 55 19.23	
8	342	256 4 36.6	3 33.8	152.46	0.29	.9933329	21.3	6 51 23.32	
9	343	257 5 36.3	4 33.4	152.51	0.28	.9932826	20.5	6 47 27.40	
10	344	258 6 37.3	5 34.1	152.56	0.25	.9932341	19.8	6 43 31.49	
11	345	259 7 39.2	6 35.8	152.60	0.17	.9931872	19.2	6 39 35.58	
12	346	260 8 42.0	7 38.4	152.63	-0.08	.9931418	18.6	6 35 39.67	
13	347	261 9 45.6	8 41.8	152.67	+0.02	.9930980	17.9	6 31 43.75	
14	348	262 10 50.0	9 46.0	152.70	0.14	.9930557	17.3	6 27 47.84	
15	349	263 11 55.1	10 50.9	152.72	0.28	.9930149	16.6	6 23 51.93	
16	350	264 13 0.7	11 56.3	152.74	0.42	.9929756	16.0	6 19 56.02	
17	351	265 14 6.8	13 2.2	152.76	0.53	.9929380	15.3	6 16 0.10	
18	352	266 15 13.3	14 8.5	152.77	0.63	.9929022	14.5	6 12 4.19	
19	353	267 16 20.0	15 15.0	152.78	0.71	.9928684	13.7	6 8 8.28	
20	354	268 17 27.0	16 21.8	152.79	0.78	.9928366	12.8	6 4 12.37	
21	355	269 18 34.1	17 28.8	152.80	0.82	.9928068	11.9	6 0 16.45	
22	356	270 19 41.4	18 35.9	152.80	0.83	.9927792	11.0	5 56 20.45	
23	357	271 20 48.8	19 43.1	152.80	0.79	.9927540	10.0	5 52 24.63	
24	358	272 21 56.3	20 50.4	152.81	0.74	.9927314	8.9	5 48 28.72	
25	359	273 23 3.9	21 57.8	152.82	0.64	.9927114	7.8	5 44 32.80	
26	360	274 24 11.6	23 5.4	152.82	0.54	.9926941	6.7	5 40 36.89	
27	361	275 25 19.4	24 13.0	152.83	0.41	.9926796	5.5	5 36 40.98	
28	362	276 26 27.3	25 20.7	152.83	0.28	.9926679	4.3	5 32 45.07	
29	363	277 27 35.5	26 28.7	152.84	0.14	.9926592	3.1	5 28 49.15	
30	364	278 28 44.0	27 37.0	152.85	+0.01	.9926535	1.9	5 24 53.24	
31	365	279 29 52.6	28 45.4	152.86	-0.12	.9926503	-0.7	5 20 57.33	
32	366	280 31 1.4	29 54.0	152.86	-0.22	9.9926499	+0.4	5 17 1.42	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 hour. —9 <sup>h</sup> .8996 (Table II.)	

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.

## SEMI-DIAMETER.

## HORIZONTAL PARALLAX.

## MERIDIAN PASSAGE.

## AGE.

Noon.

Midnight.

Noon.

Diff. for  
1 hour.

Midnight.

Diff. for  
1 hour.

h m

m

d

17.5

18.5

19.5

20.5

21.5

22.5

23.5

24.5

25.5

26.5

27.5

28.5

0.0

1.0

2.0

3.0

4.0

5.0

6.0

7.0

8.0

9.0

10.0

11.0

12.0

13.0

14.0

15.0

16.0

17.0

18.0

19.0

1

14 53.1

14 55.8

54 30.8

+0.77

54 40.8

+0.89

14 22.1

2.05

17.5

2

14 58.9

15 2.5

54 52.3

1.01

55 5.2

1.13

15 10.6

1.99

18.5

3

15 6.4

15 10.8

55 19.7

1.27

55 35.7

1.40

15 57.5

1.93

19.5

4

15 15.5

15 20.8

55 53.3

1.53

56 12.5

1.66

16 43.3

1.89

20.5

5

15 26.4

15 32.5

56 33.3

1.78

56 55.5

1.90

17 28.5

1.89

21.5

6

15 38.9

15 45.6

57 19.0

2.01

57 43.6

2.09

18 14.2

1.93

22.5

7

15 52.5

15 59.5

58 9.0

2.14

58 34.9

2.16

19 1.6

2.03

23.5

8

16 6.6

16 13.5

59 0.8

2.14

59 26.2

2.07

19 52.0

2.19

24.5

9

16 20.1

16 26.2

59 50.3

1.94

60 12.6

1.76

20 46.6

2.39

25.5

10

16 31.6

16 36.1

60 32.5

1.53

60 49.3

1.34

21 46.1

2.58

26.5

11

16 39.7

16 42.1

61 2.3

0.90

61 11.0

+0.53

22 49.9

2.73

27.5

12

16 43.2

16 43.0

61 15.2

+0.14

61 14.4

-0.26

23 55.9

2.75

28.5

13

16 41.5

16 38.6

61 8.8

-0.67

60 58.3

1.06

6

0.0

14

16 34.6

16 29.3

60 43.4

1.41

60 24.4

1.73

1 0.9

2.64

1.0

15

16 23.3

16 16.4

60 2.0

1.99

59 36.8

2.19

2 2.0

2.44

2.0

16

16 9.1

16 1.2

59 9.6

2.33

58 41.0

2.41

2 58.0

2.22

3.0

17

15 53.3

15 45.3

58 11.7

2.43

57 42.5

2.41

3 48.9

2.02

4.0

18

15 37.5

15 30.0

57 13.9

2.34

56 46.5

2.23

4 35.8

1.88

5.0

19

15 23.0

15 16.4

56 20.5

2.09

55 56.4

1.92

5 19.9

1.80

6.0

20

15 10.4

15 5.1

55 34.4

1.74

55 14.7

1.55

6 2.5

1.76

7.0

21

15 0.3

14 56.3

54 57.3

1.35

54 42.4

1.15

6 44.8

1.77

8.0

22

14 52.8

14 50.0

54 29.8

0.95

54 19.6

0.74

7 27.8

1.82

9.0

23

14 47.9

14 46.4

54 11.8

0.55

54 6.2

0.37

8 12.2

1.89

10.0

24

14 45.5

14 45.0

54 2.7

-0.20

54 1.3

-0.04

8 58.5

1.98

11.0

25

14 45.2

14 45.8

54 1.7

+0.10

54 3.8

+0.24

9 46.9

2.06

12.0

26

14 46.8

14 48.2

54 7.6

0.37

54 13.0

0.48

10 36.9

2.11

13.0

27

14 49.9

14 52.0

54 19.2

0.58

54 26.8

0.68

11 27.7

2.12

14.0

28

14 54.4

14 57.0

54 35.4

0.76

54 45.0

0.84

12 18.3

2.09

15.0

29

14 59.8

15 2.9

54 55.5

0.91

55 6.8

0.98

13 7.7

2.03

16.0

30

15 6.2

15 9.7

55 18.9

1.04

55 31.8

1.10

13 55.6

1.96

17.0

31

15 13.4

15 17.3

55 45.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 1.					WEDNESDAY 3.				
0	6 <sup>h</sup> 33 <sup>m</sup> 14.55 <sup>s</sup>	2.1756	N. 23° 59' 20.6"	4.421	0	8 <sup>h</sup> 15 <sup>m</sup> 13.08 <sup>s</sup>	2.0875	N. 18° 21' 3.1"	9.455
1	6 35 25.04	2.1739	23 54 51.7	4.539	1	8 17 17.06	2.0851	18 11 33.1	9.545
2	6 37 35.42	2.1722	23 50 15.9	4.655	2	8 19 20.89	2.0827	18 1 57.7	9.635
3	6 39 45.70	2.1704	23 45 33.1	4.771	3	8 21 24.58	2.0803	17 52 16.9	9.723
4	6 41 55.87	2.1687	23 40 43.4	4.887	4	8 23 28.13	2.0581	17 42 30.9	9.811
5	6 44 5.94	2.1669	23 35 46.7	5.003	5	8 25 31.55	2.0558	17 32 39.6	9.898
6	6 46 15.90	2.1650	23 30 43.1	5.117	6	8 27 34.83	2.0535	17 22 43.1	9.984
7	6 48 25.74	2.1631	23 25 32.6	5.233	7	8 29 37.97	2.0512	17 12 41.5	10.069
8	6 50 35.47	2.1612	23 20 15.3	5.346	8	8 31 40.98	2.0490	17 2 34.8	10.155
9	6 52 45.08	2.1592	23 14 51.1	5.459	9	8 33 43.85	2.0468	16 52 22.9	10.240
10	6 54 54.57	2.1572	23 9 20.2	5.572	10	8 35 46.59	2.0446	16 42 6.0	10.323
11	6 57 3.94	2.1551	23 3 42.5	5.685	11	8 37 49.20	2.0425	16 31 44.2	10.405
12	6 59 13.18	2.1530	22 57 58.0	5.797	12	8 39 51.69	2.0404	16 21 17.4	10.487
13	7 1 22.30	2.1509	22 52 6.8	5.909	13	8 41 54.05	2.0383	16 10 45.7	10.569
14	7 3 31.29	2.1487	22 46 8.9	6.020	14	8 43 56.28	2.0362	16 0 9.1	10.650
15	7 5 40.15	2.1466	22 40 4.4	6.131	15	8 45 58.39	2.0342	15 49 27.7	10.739
16	7 7 48.88	2.1444	22 33 53.2	6.241	16	8 48 0.38	2.0322	15 38 41.6	10.806
17	7 9 57.48	2.1422	22 27 35.5	6.350	17	8 50 2.25	2.0302	15 27 50.7	10.887
18	7 12 5.94	2.1399	22 21 11.2	6.459	18	8 52 4.01	2.0282	15 16 55.1	10.965
19	7 14 14.27	2.1377	22 14 40.4	6.567	19	8 54 5.65	2.0264	15 5 54.9	11.042
20	7 16 22.46	2.1354	22 8 3.1	6.676	20	8 56 7.18	2.0246	14 54 50.1	11.118
21	7 18 30.51	2.1331	22 1 19.3	6.784	21	8 58 8.60	2.0227	14 43 40.7	11.194
22	7 20 38.43	2.1307	21 54 29.0	6.891	22	9 0 9.91	2.0209	14 32 26.8	11.269
23	7 22 46.20	2.1283	N. 21° 47' 32.4"	6.997	23	9 2 11.11	2.0192	N. 14° 21' 8.4"	11.343
TUESDAY 2.					THURSDAY 4.				
0	7 24 53.83	2.1260	N. 21° 40' 29.4"	7.103	0	9 4 12.21	2.0175	N. 14° 9' 45.6"	11.416
1	7 27 1.32	2.1236	21 33 20.0	7.208	1	9 6 13.21	2.0158	13 58 18.4	11.489
2	7 29 8.66	2.1212	21 26 4.4	7.313	2	9 8 14.11	2.0142	13 46 46.9	11.561
3	7 31 15.86	2.1188	21 18 42.5	7.417	3	9 10 14.91	2.0126	13 35 11.1	11.633
4	7 33 22.92	2.1164	21 11 14.4	7.520	4	9 12 15.62	2.0111	13 23 31.1	11.709
5	7 35 29.83	2.1139	21 3 40.1	7.622	5	9 14 16.24	2.0097	13 11 46.9	11.779
6	7 37 36.59	2.1114	20 55 59.7	7.724	6	9 16 16.78	2.0082	12 59 58.5	11.841
7	7 39 43.20	2.1090	20 48 13.2	7.826	7	9 18 17.23	2.0068	12 48 6.0	11.906
8	7 41 49.67	2.1066	20 40 20.6	7.927	8	9 20 17.60	2.0054	12 36 9.5	11.976
9	7 43 55.99	2.1041	20 32 21.9	8.028	9	9 22 17.88	2.0041	12 24 8.9	12.042
10	7 45 2.16	2.1016	20 24 17.2	8.128	10	9 24 18.09	2.0029	12 12 4.4	12.108
11	7 48 8.18	2.0992	20 16 6.6	8.227	11	9 26 18.23	2.0017	11 59 55.9	12.174
12	7 50 14.06	2.0967	20 7 50.0	8.326	12	9 28 18.30	2.0006	11 47 43.5	12.238
13	7 52 19.79	2.0942	19 59 27.5	8.423	13	9 30 18.30	1.9995	11 35 27.3	12.301
14	7 54 25.37	2.0917	19 50 50.2	8.520	14	9 32 18.24	1.9984	11 23 7.4	12.363
15	7 56 30.80	2.0892	19 42 25.1	8.617	15	9 34 18.11	1.9974	11 10 43.7	12.426
16	7 58 36.08	2.0868	19 33 45.2	8.713	16	9 36 17.93	1.9966	10 58 16.3	12.487
17	8 0 41.22	2.0844	19 24 59.6	8.808	17	9 38 17.70	1.9957	10 45 45.3	12.547
18	8 2 46.21	2.0819	19 16 8.3	8.903	18	9 40 17.41	1.9949	10 33 10.6	12.607
19	8 4 51.05	2.0795	19 7 11.3	8.997	19	9 42 17.08	1.9941	10 20 32.4	12.666
20	8 6 55.75	2.0771	18 58 8.7	9.090	20	9 44 16.70	1.9933	10 7 50.7	12.724
21	8 9 0.30	2.0746	18 49 0.6	9.182	21	9 46 16.28	1.9927	9 55 5.5	12.782
22	8 11 4.70	2.0722	18 39 46.9	9.274	22	9 48 15.82	1.9921	9 42 16.9	12.838
23	8 13 8.96	2.0698	18 30 27.7	9.365	23	9 50 15.33	1.9916	9 29 25.0	12.893
24	8 15 13.08	2.0675	N. 18° 21' 3.1"	9.455	24	9 52 14.81	1.9912	N. 9° 16' 29.8"	12.946

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 5.					SUNDAY 7.				
0	9 52 14.81	1.9919	N. 9 16' 29.8"	13.948	0	11 28 34.81	2.0515	S. 1 51' 50.8"	14.541
1	9 54 14.27	1.9907	9 3 31.3	13.002	1	11 30 37.99	2.0547	2 6 23.5	14.549
2	9 56 13.70	1.9903	8 50 29.6	13.055	2	11 32 41.37	2.0580	2 20 50.7	14.556
3	9 58 13.11	1.9900	8 37 24.7	13.107	3	11 34 44.95	2.0613	2 35 30.2	14.562
4	10 0 12.50	1.9896	8 24 16.7	13.159	4	11 36 48.73	2.0647	2 50 4.1	14.568
5	10 2 11.89	1.9897	8 11 5.6	13.210	5	11 38 52.72	2.0682	3 4 38.3	14.573
6	10 4 11.27	1.9896	7 57 51.5	13.260	6	11 40 56.92	2.0718	3 19 12.7	14.574
7	10 6 10.64	1.9896	7 44 34.4	13.309	7	11 43 1.34	2.0755	3 33 47.2	14.576
8	10 8 10.02	1.9897	7 31 14.4	13.357	8	11 45 5.98	2.0792	3 48 21.8	14.576
9	10 10 9.40	1.9898	7 17 51.5	13.405	9	11 47 10.85	2.0831	4 2 56.3	14.574
10	10 12 8.79	1.9900	7 4 25.8	13.452	10	11 49 15.95	2.0871	4 17 30.7	14.578
11	10 14 8.20	1.9902	6 50 57.3	13.498	11	11 51 21.30	2.0912	4 32 5.0	14.580
12	10 16 7.62	1.9905	6 37 26.1	13.543	12	11 53 26.89	2.0952	4 46 39.0	14.584
13	10 18 7.06	1.9909	6 23 52.2	13.587	13	11 55 32.72	2.0993	5 1 12.7	14.588
14	10 20 6.53	1.9913	6 10 15.7	13.632	14	11 57 38.81	2.1036	5 15 46.0	14.591
15	10 22 6.02	1.9918	5 56 36.7	13.671	15	11 59 45.16	2.1080	5 30 18.8	14.592
16	10 24 5.55	1.9924	5 42 55.1	13.713	16	12 1 51.77	2.1124	5 44 51.0	14.593
17	10 26 5.11	1.9930	5 29 11.1	13.754	17	12 3 58.65	2.1170	5 59 22.6	14.591
18	10 28 4.71	1.9937	5 15 24.6	13.794	18	12 6 5.81	2.1216	6 13 53.5	14.588
19	10 30 4.36	1.9946	5 1 35.8	13.832	19	12 8 13.24	2.1263	6 28 23.6	14.494
20	10 32 4.06	1.9955	4 47 44.7	13.870	20	12 10 20.96	2.1311	6 42 52.8	14.478
21	10 34 3.82	1.9965	4 33 51.4	13.907	21	12 12 28.97	2.1360	6 57 21.0	14.461
22	10 36 3.64	1.9975	4 19 55.9	13.943	22	12 14 37.28	2.1409	7 11 48.1	14.442
23	10 38 3.52	1.9986	N. 4 5 58.2	13.979	23	12 16 45.88	2.1458	S. 7 26 14.1	14.423
SATURDAY 6.					MONDAY 8.				
0	10 40 3.47	1.9997	N. 3 51 58.4	14.013	0	12 18 54.78	2.1509	S. 7 40 38.9	14.402
1	10 42 3.49	2.0010	3 37 56.6	14.047	1	12 21 3.99	2.1560	7 55 2.4	14.379
2	10 44 3.59	2.0023	3 23 52.8	14.079	2	12 23 13.52	2.1615	8 9 24.4	14.354
3	10 46 3.77	2.0037	3 9 47.1	14.111	3	12 25 23.37	2.1668	8 23 44.9	14.328
4	10 48 4.04	2.0052	2 55 39.5	14.141	4	12 27 33.54	2.1722	8 38 3.8	14.302
5	10 50 4.40	2.0067	2 41 30.2	14.170	5	12 29 44.03	2.1777	8 52 21.1	14.273
6	10 52 4.85	2.0083	2 27 19.1	14.199	6	12 31 54.86	2.1833	9 6 36.6	14.242
7	10 54 5.40	2.0101	2 13 6.3	14.227	7	12 34 6.03	2.1890	9 20 50.2	14.211
8	10 56 6.06	2.0119	1 58 51.9	14.253	8	12 36 17.54	2.1947	9 35 1.9	14.178
9	10 58 6.83	2.0138	1 44 35.9	14.279	9	12 38 29.39	2.2005	9 49 11.5	14.143
10	11 0 7.71	2.0157	1 30 18.4	14.303	10	12 40 41.60	2.2065	10 3 19.0	14.106
11	11 2 8.71	2.0177	1 15 50.5	14.327	11	12 42 54.17	2.2124	10 17 24.2	14.067
12	11 4 9.84	2.0199	1 1 39.1	14.351	12	12 45 7.09	2.2184	10 31 27.0	14.027
13	11 6 11.10	2.0221	0 47 17.4	14.372	13	12 47 20.38	2.2246	10 45 27.4	13.988
14	11 8 12.49	2.0243	0 32 54.5	14.392	14	12 49 34.04	2.2308	10 59 25.3	13.943
15	11 10 14.01	2.0266	0 18 30.3	14.412	15	12 51 48.07	2.2370	11 13 20.5	13.898
16	11 12 15.68	2.0291	N. 0 4 5.0	14.430	16	12 54 2.48	2.2434	11 27 13.0	13.851
17	11 14 17.50	2.0317	S. 0 10 21.3	14.447	17	12 56 17.28	2.2498	11 41 2.6	13.802
18	11 16 19.48	2.0342	0 24 48.7	14.464	18	12 58 32.46	2.2562	11 54 49.2	13.752
19	11 18 21.61	2.0369	0 39 17.0	14.479	19	13 0 48.03	2.2628	12 8 32.8	13.700
20	11 20 23.91	2.0396	0 53 46.2	14.494	20	13 3 4.00	2.2695	12 22 13.2	13.647
21	11 22 26.37	2.0424	1 8 16.3	14.507	21	13 5 20.37	2.2762	12 35 50.4	13.592
22	11 24 29.00	2.0453	1 22 47.1	14.519	22	13 7 37.14	2.2828	12 49 24.2	13.534
23	11 26 31.81	2.0484	1 37 18.6	14.531	23	13 9 54.31	2.2896	13 2 54.5	13.476
24	11 28 34.81	2.0515	S. 1 51 50.8	14.541	24	13 12 11.80	2.2965	S. 13 16 21.3	13.415



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 9.					THURSDAY 11.				
0	<sup>h</sup> 13 <sup>m</sup> 12 <sup>s</sup> 11.89	2.3065	S. 13° 16' 21.3"	13.415	0	<sup>h</sup> 15 <sup>m</sup> 10 <sup>s</sup> 57.35	2.6507	S. 22° 13' 6.7"	8.180
1	13 14 29.89	2.3034	13 29 44.3	13.352	1	15 13 36.59	2.6573	22 21 12.8	8.092
2	13 16 48.30	2.3103	13 43 3.5	13.988	2	15 16 16.23	2.6638	22 29 9.4	7.883
3	13 19 7.13	2.3174	13 56 18.8	13.222	3	15 18 56.25	2.6709	22 36 56.4	7.708
4	13 21 26.39	2.3246	14 9 30.1	13.153	4	15 21 36.65	2.6765	22 44 33.7	7.530
5	13 23 46.08	2.3317	14 22 37.2	13.083	5	15 24 17.43	2.6827	22 52 1.1	7.374
6	13 26 6.19	2.3389	14 35 40.0	13.011	6	15 26 58.57	2.6887	22 59 18.6	7.208
7	13 28 26.74	2.3461	14 48 38.5	12.937	7	15 29 40.07	2.6947	23 6 26.1	7.041
8	13 30 47.72	2.3533	15 1 32.4	12.860	8	15 32 21.93	2.7005	23 13 23.5	6.871
9	13 33 9.14	2.3607	15 14 21.7	12.782	9	15 35 4.13	2.7062	23 20 10.6	6.699
10	13 35 31.00	2.3680	15 27 6.3	12.703	10	15 37 46.67	2.7118	23 26 47.4	6.527
11	13 37 53.30	2.3754	15 39 46.1	12.622	11	15 40 29.54	2.7173	23 33 13.9	6.354
12	13 40 16.05	2.3829	15 52 20.9	12.538	12	15 43 12.74	2.7226	23 39 29.9	6.178
13	13 42 39.25	2.3904	16 4 50.6	12.452	13	15 45 56.25	2.7277	23 45 35.2	6.001
14	13 45 2.90	2.3978	16 17 15.1	12.364	14	15 48 40.06	2.7326	23 51 30.0	5.822
15	13 47 26.99	2.4053	16 29 34.3	12.275	15	15 51 24.16	2.7374	23 57 13.9	5.642
16	13 49 51.54	2.4130	16 41 48.1	12.183	16	15 54 8.55	2.7422	24 2 47.0	5.461
17	13 52 16.55	2.4206	16 53 56.3	12.089	17	15 56 53.23	2.7468	24 8 9.2	5.278
18	13 54 42.01	2.4282	17 5 58.8	11.993	18	15 59 38.17	2.7512	24 13 20.4	5.095
19	13 57 7.93	2.4358	17 17 55.5	11.896	19	16 2 23.37	2.7554	24 18 20.6	4.910
20	13 59 34.31	2.4435	17 29 46.3	11.797	20	16 5 8.82	2.7594	24 23 9.6	4.723
21	14 2 1.15	2.4512	17 41 31.1	11.695	21	16 7 54.50	2.7633	24 27 47.4	4.536
22	14 4 28.45	2.4588	17 53 9.7	11.591	22	16 10 40.41	2.7670	24 32 13.9	4.347
23	14 6 56.21	2.4665	S. 18° 4' 42.0"	11.484	23	16 13 26.54	2.7705	S. 24° 36' 29.1"	4.158
WEDNESDAY 10.					FRIDAY 12.				
0	14 0 24.43	2.4742	S. 18° 16' 7.8"	11.378	0	16 16 12.87	2.7738	S. 24° 40' 32.9"	3.968
1	14 11 53.11	2.4818	18 27 27.1	11.267	1	16 18 59.40	2.7770	24 44 25.3	3.777
2	14 14 22.25	2.4896	18 38 39.8	11.155	2	16 21 46.11	2.7800	24 48 6.1	3.584
3	14 16 51.86	2.4973	18 49 45.7	11.041	3	16 24 33.00	2.7828	24 51 35.4	3.391
4	14 19 21.93	2.5050	19 0 44.7	10.925	4	16 27 20.05	2.7854	24 54 53.1	3.198
5	14 21 52.46	2.5126	19 11 36.7	10.807	5	16 30 7.25	2.7877	24 57 59.2	3.004
6	14 24 23.44	2.5202	19 22 21.5	10.687	6	16 32 54.58	2.7899	25 0 53.6	2.809
7	14 26 54.88	2.5278	19 32 59.1	10.564	7	16 35 42.04	2.7920	25 3 36.3	2.613
8	14 29 26.78	2.5354	19 43 29.2	10.439	8	16 38 29.62	2.7938	25 6 7.2	2.417
9	14 31 59.13	2.5430	19 53 51.8	10.312	9	16 41 17.30	2.7954	25 8 26.3	2.220
10	14 34 31.94	2.5506	20 4 6.7	10.184	10	16 44 5.07	2.7968	25 10 33.6	2.022
11	14 37 5.20	2.5581	20 14 13.9	10.054	11	16 46 52.92	2.7980	25 12 29.0	1.825
12	14 39 38.91	2.5656	20 24 13.2	9.922	12	16 49 40.83	2.7990	25 14 12.6	1.627
13	14 42 13.07	2.5730	20 34 4.5	9.787	13	16 52 28.80	2.7998	25 15 44.3	1.429
14	14 44 47.67	2.5803	20 43 47.7	9.651	14	16 55 16.81	2.8003	25 17 4.1	1.230
15	14 47 22.71	2.5876	20 53 22.6	9.512	15	16 58 4.84	2.8007	25 18 11.9	1.031
16	14 49 58.19	2.5949	21 2 49.2	9.372	16	17 0 52.89	2.8008	25 19 7.8	0.832
17	14 52 34.10	2.6022	21 12 7.3	9.230	17	17 3 40.94	2.8008	25 19 51.8	0.634
18	14 55 10.45	2.6093	21 21 16.8	9.086	18	17 6 28.99	2.8006	25 20 23.9	0.435
19	14 57 47.22	2.6164	21 30 17.6	8.939	19	17 9 17.01	2.8001	25 20 44.0	0.236
20	15 0 24.42	2.6235	21 39 9.5	8.791	20	17 12 5.00	2.7994	25 20 52.2	-0.037
21	15 3 2.04	2.6304	21 47 52.5	8.641	21	17 14 52.94	2.7985	25 20 48.5	+0.162
22	15 5 40.07	2.6372	21 56 26.4	8.489	22	17 17 40.82	2.7974	25 20 32.8	0.380
23	15 8 18.51	2.6440	22 4 51.2	8.336	23	17 20 28.63	2.7962	25 20 5.3	0.556
24	15 10 57.35	2.6507	S. 22° 13' 6.7"	8.180	24	17 23 16.36	2.7947	S. 25° 19' 25.9"	0.736

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 13.					MONDAY 15.				
0	17 23 16.36	2.7947	S. 25° 19' 25.9"	0.756	0	19 32 17.55	2.5985	S. 21° 13' 21.8"	8.947
1	17 26 3.99	2.7989	25 18 34.6	0.953	1	19 34 49.02	2.5904	21 4 21.0	9.077
2	17 28 51.51	2.7910	25 17 31.5	1.150	2	19 37 20.00	2.5193	20 55 12.5	9.905
3	17 31 38.91	2.7889	25 16 16.6	1.346	3	19 39 50.50	2.5042	20 45 56.4	9.331
4	17 34 26.18	2.7866	25 14 50.0	1.542	4	19 42 20.51	2.4960	20 36 32.8	9.455
5	17 37 13.30	2.7840	25 13 11.6	1.737	5	19 44 50.02	2.4877	20 27 1.8	9.577
6	17 40 0.26	2.7813	25 11 21.5	1.932	6	19 47 19.04	2.4795	20 17 23.6	9.697
7	17 42 47.06	2.7784	25 9 19.7	2.196	7	19 49 47.56	2.4712	20 7 38.2	9.815
8	17 45 33.67	2.7763	25 7 6.4	2.319	8	19 52 15.59	2.4630	19 57 45.8	9.939
9	17 48 20.09	2.7790	25 4 41.5	2.511	9	19 54 43.12	2.4547	19 47 46.4	10.046
10	17 51 6.31	2.7685	25 2 5.1	2.702	10	19 57 10.15	2.4464	19 37 40.3	10.157
11	17 53 52.31	2.7647	24 59 17.2	2.893	11	19 59 36.69	2.4382	19 27 27.5	10.267
12	17 56 38.08	2.7608	24 56 17.9	3.082	12	20 2 2.73	2.4298	19 17 8.2	10.375
13	17 59 23.61	2.7568	24 53 7.3	3.271	13	20 4 28.27	2.4215	19 6 42.5	10.481
14	18 2 8.90	2.7527	24 49 45.4	3.459	14	20 6 53.31	2.4132	18 56 10.5	10.586
15	18 4 53.93	2.7483	24 46 12.2	3.646	15	20 9 17.86	2.4050	18 45 32.2	10.688
16	18 7 38.69	2.7437	24 42 27.9	3.831	16	20 11 41.91	2.3967	18 34 47.9	10.788
17	18 10 22.17	2.7389	24 38 32.5	4.015	17	20 14 5.47	2.3885	18 23 57.6	10.887
18	18 13 7.36	2.7340	24 34 26.1	4.197	18	20 16 28.53	2.3802	18 13 1.5	10.983
19	18 15 51.25	2.7289	24 30 8.8	4.379	19	20 18 51.10	2.3720	18 1 59.6	11.077
20	18 18 34.83	2.7237	24 25 40.6	4.560	20	20 21 13.17	2.3638	17 50 52.2	11.169
21	18 21 18.09	2.7183	24 21 1.6	4.738	21	20 23 34.75	2.3556	17 39 39.3	11.260
22	18 24 1.02	2.7128	24 16 12.0	4.916	22	20 25 55.84	2.3475	17 28 21.0	11.349
23	18 26 43.62	2.7071	S. 24° 11' 11.7"	5.092	23	20 28 16.45	2.3394	S. 17° 16' 57.4"	11.437
SUNDAY 14.					TUESDAY 16.				
0	18 29 25.87	2.7012	S. 24° 6' 0.9"	5.267	0	20 30 36.57	2.3313	S. 17° 5' 28.6"	11.529
1	18 32 7.76	2.6959	24 0 39.6	5.441	1	20 32 56.21	2.3233	16 53 54.8	11.604
2	18 34 49.29	2.6901	23 55 8.0	5.612	2	20 35 15.37	2.3152	16 42 16.1	11.666
3	18 37 30.45	2.6838	23 49 26.2	5.789	3	20 37 34.04	2.3073	16 30 32.5	11.766
4	18 40 11.23	2.6765	23 43 34.2	5.960	4	20 39 52.23	2.2993	16 18 44.2	11.842
5	18 42 51.63	2.6700	23 37 32.2	6.117	5	20 42 9.96	2.2915	16 6 51.4	11.917
6	18 45 31.63	2.6633	23 31 20.2	6.269	6	20 44 27.22	2.2837	15 54 54.1	11.992
7	18 48 11.23	2.6566	23 24 58.4	6.445	7	20 46 44.01	2.2759	15 42 52.4	12.064
8	18 50 50.43	2.6498	23 18 26.8	6.607	8	20 49 0.33	2.2682	15 30 46.4	12.135
9	18 53 29.21	2.6428	23 11 45.5	6.767	9	20 51 16.19	2.2605	15 18 36.2	12.203
10	18 56 7.57	2.6357	23 4 54.7	6.926	10	20 53 31.59	2.2528	15 6 22.0	12.270
11	18 58 45.50	2.6286	22 57 54.4	7.082	11	20 55 46.53	2.2452	14 54 3.8	12.335
12	19 1 23.00	2.6213	22 50 44.8	7.237	12	20 58 1.02	2.2377	14 41 41.8	12.398
13	19 4 0.06	2.6140	22 43 26.0	7.389	13	21 0 15.06	2.2303	14 29 16.0	12.460
14	19 6 36.68	2.6066	22 35 58.1	7.541	14	21 2 28.66	2.2229	14 16 40.6	12.520
15	19 9 12.85	2.5991	22 28 21.1	7.691	15	21 4 41.81	2.2156	14 4 13.6	12.578
16	19 11 48.57	2.5915	22 20 35.2	7.838	16	21 6 54.53	2.2083	13 51 37.2	12.635
17	19 14 23.83	2.5839	22 12 40.6	7.983	17	21 9 6.81	2.2011	13 38 57.4	12.691
18	19 16 58.04	2.5762	22 4 37.3	8.127	18	21 11 18.66	2.1940	13 26 14.3	12.744
19	19 19 32.98	2.5684	21 56 25.4	8.268	19	21 13 30.09	2.1869	13 13 28.1	12.796
20	19 22 6.85	2.5605	21 48 5.1	8.407	20	21 15 41.09	2.1798	13 0 38.8	12.846
21	19 24 40.24	2.5526	21 39 36.5	8.546	21	21 17 51.67	2.1729	12 47 46.6	12.894
22	19 27 13.16	2.5447	21 30 59.6	8.682	22	21 20 1.84	2.1661	12 34 51.5	12.942
23	19 29 45.60	2.5366	21 22 14.7	8.815	23	21 22 11.60	2.1593	12 21 53.6	12.987
24	19 32 17.55	2.5285	S. 21° 13' 21.8"	8.947	24	21 24 20.95	2.1525	S. 12° 8' 53.1"	13.030

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 17.					FRIDAY 19.				
0	<sup>h</sup> 21 <sup>m</sup> 24 <sup>s</sup> 20.95	2.1535	S. 12° 6' 53.1"	13.030	0	<sup>h</sup> 23 <sup>m</sup> 1 <sup>s</sup> 25.39	1.9338	S. 1° 17' 48.3"	13.659
1	21 26 29.90	2.1459	11 55 50.0	13.073	1	23 3 20.73	1.9210	1 4 9.1	13.647
2	21 28 38.46	2.1393	11 42 44.3	13.115	2	23 5 15.91	1.9183	0 50 30.7	13.633
3	21 30 46.62	2.1327	11 29 36.2	13.154	3	23 7 10.93	1.9157	0 36 53.2	13.618
4	21 32 54.39	2.1263	11 16 25.8	13.192	4	23 9 5.80	1.9132	0 23 16.5	13.604
5	21 35 1.78	2.1200	11 3 13.1	13.229	5	23 11 0.52	1.9108	S. 0 9 40.7	13.589
6	21 37 8.79	2.1137	10 49 58.3	13.263	6	23 12 55.10	1.9085	N. 0 3 54.2	13.573
7	21 39 15.42	2.1075	10 36 41.5	13.297	7	23 14 49.54	1.9062	0 17 28.1	13.556
8	21 41 21.69	2.1014	10 23 22.6	13.331	8	23 16 43.85	1.9040	0 31 0.9	13.537
9	21 43 27.59	2.0953	10 10 1.8	13.362	9	23 18 38.02	1.9018	0 44 32.5	13.517
10	21 45 33.13	2.0894	9 56 39.2	13.392	10	23 20 32.07	1.8999	0 58 3.0	13.498
11	21 47 38.32	2.0836	9 43 14.8	13.420	11	23 22 26.01	1.8980	1 11 32.3	13.478
12	21 49 43.16	2.0778	9 29 48.8	13.447	12	23 24 19.83	1.8961	1 25 0.4	13.457
13	21 51 47.66	2.0721	9 16 21.2	13.473	13	23 26 13.54	1.8943	1 38 27.2	13.435
14	21 53 51.81	2.0663	9 2 52.1	13.497	14	23 28 7.14	1.8925	1 51 52.6	13.413
15	21 55 55.62	2.0607	8 49 21.6	13.520	15	23 30 0.64	1.8908	2 5 16.7	13.390
16	21 57 59.10	2.0553	8 35 49.7	13.542	16	23 31 54.04	1.8892	2 18 39.4	13.366
17	22 0 2.26	2.0499	8 22 16.6	13.562	17	23 33 47.35	1.8878	2 32 0.6	13.340
18	22 2 5.09	2.0445	8 8 42.3	13.582	18	23 35 40.58	1.8864	2 45 20.2	13.314
19	22 4 7.60	2.0393	7 55 6.8	13.600	19	23 37 33.72	1.8851	2 58 38.3	13.288
20	22 6 9.81	2.0343	7 41 30.3	13.617	20	23 39 26.79	1.8838	3 11 54.8	13.262
21	22 8 11.71	2.0293	7 27 52.8	13.633	21	23 41 19.78	1.8826	3 25 9.7	13.234
22	22 10 13.31	2.0242	7 14 14.4	13.647	22	23 43 12.70	1.8815	3 38 22.9	13.206
23	22 12 14.61	2.0193	S. 7 0 35.1	13.661	23	23 45 5.56	1.8804	N. 3 51 34.4	13.177
THURSDAY 18.					SATURDAY 20.				
0	22 14 15.62	2.0145	S. 6 46 55.1	13.673	0	23 46 58.35	1.8794	N. 4 4 44.1	13.147
1	22 16 16.35	2.0097	6 33 14.4	13.684	1	23 48 51.09	1.8786	4 17 52.0	13.116
2	22 18 16.79	2.0050	6 19 33.0	13.695	2	23 50 43.78	1.8777	4 30 58.0	13.085
3	22 20 16.95	2.0004	6 5 51.0	13.703	3	23 52 36.42	1.8769	4 44 2.2	13.054
4	22 22 16.84	1.9960	5 52 8.6	13.711	4	23 54 29.01	1.8763	4 57 4.5	13.022
5	22 24 16.47	1.9917	5 38 25.7	13.718	5	23 56 21.57	1.8757	5 10 4.8	12.988
6	22 26 15.84	1.9873	5 24 42.4	13.724	6	23 58 14.09	1.8751	5 23 3.0	12.953
7	22 28 14.95	1.9831	5 10 58.8	13.728	7	0 0 6.58	1.8746	5 35 59.2	12.919
8	22 30 13.81	1.9789	4 57 15.0	13.732	8	0 1 59.04	1.8742	5 48 53.3	12.884
9	22 32 12.42	1.9748	4 43 31.0	13.734	9	0 3 51.48	1.8739	6 1 45.3	12.848
10	22 34 10.79	1.9708	4 29 46.9	13.736	10	0 5 43.91	1.8737	6 14 35.1	12.812
11	22 36 8.92	1.9669	4 16 2.7	13.737	11	0 7 36.32	1.8734	6 27 22.7	12.774
12	22 38 6.82	1.9633	4 2 18.5	13.736	12	0 9 28.72	1.8733	6 40 8.0	12.736
13	22 40 4.50	1.9595	3 48 34.4	13.735	13	0 11 21.12	1.8732	6 52 51.0	12.696
14	22 42 1.96	1.9558	3 34 50.3	13.733	14	0 13 13.51	1.8732	7 5 31.7	12.659
15	22 43 59.19	1.9521	3 21 6.4	13.729	15	0 15 5.91	1.8733	7 18 10.1	12.619
16	22 45 56.21	1.9487	3 7 22.8	13.725	16	0 16 58.31	1.8734	7 30 46.0	12.578
17	22 47 53.03	1.9453	2 53 39.4	13.720	17	0 18 50.72	1.8737	7 43 19.5	12.537
18	22 49 49.65	1.9420	2 39 56.4	13.713	18	0 20 43.15	1.8739	7 55 50.5	12.496
19	22 51 46.07	1.9388	2 26 13.8	13.706	19	0 22 35.59	1.8742	8 8 19.0	12.453
20	22 53 42.30	1.9356	2 12 31.6	13.699	20	0 24 28.06	1.8746	8 20 44.9	12.410
21	22 55 38.34	1.9325	1 58 49.9	13.691	21	0 26 20.55	1.8751	8 33 8.2	12.367
22	22 57 34.20	1.9295	1 45 8.7	13.681	22	0 28 13.07	1.8757	8 45 28.9	12.323
23	22 59 29.88	1.9266	1 31 28.2	13.670	23	0 30 5.63	1.8763	8 57 46.9	12.278
24	23 1 25.39	1.9238	S. 1 17 48.3	13.659	24	0 31 58.23	1.8770	N. 9 10 2.2	12.233

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 21.					TUESDAY 23.				
0	0 31 58.23	1.8770	N. 9 10' 22"	12.333	0	2 3 52.13	1.9703	N. 17 52' 38.9"	9.998
1	0 33 50.87	1.8777	9 22 14.8	12.186	1	2 5 50.44	1.9739	18 1 54.5	9.991
2	0 35 43.55	1.8784	9 34 24.5	12.138	2	2 7 48.92	1.9769	18 11 5.4	9.143
3	0 37 36.28	1.8793	9 46 31.4	12.091	3	2 9 47.58	1.9792	18 20 11.7	9.065
4	0 39 29.06	1.8809	9 58 35.4	12.043	4	2 11 46.42	1.9829	18 29 13.2	8.985
5	0 41 21.90	1.8811	10 10 36.5	11.994	5	2 13 45.45	1.9853	18 38 9.9	8.906
6	0 43 14.79	1.8821	10 22 34.7	11.945	6	2 15 44.66	1.9884	18 47 1.9	8.826
7	0 45 7.75	1.8833	10 34 29.9	11.895	7	2 17 44.06	1.9915	18 55 40.0	8.744
8	0 47 0.78	1.8843	10 46 22.1	11.844	8	2 19 43.64	1.9946	19 4 31.2	8.663
9	0 48 53.87	1.8855	10 58 11.2	11.792	9	2 21 43.41	1.9977	19 13 8.5	8.581
10	0 50 47.04	1.8868	11 9 57.2	11.741	10	2 23 43.37	2.0009	19 21 40.9	8.497
11	0 52 40.29	1.8881	11 21 40.1	11.689	11	2 25 43.52	2.0040	19 30 8.2	8.413
12	0 54 33.61	1.8894	11 33 19.9	11.636	12	2 27 43.85	2.0072	19 38 30.5	8.329
13	0 56 27.02	1.8909	11 44 56.4	11.582	13	2 29 44.38	2.0104	19 46 47.7	8.244
14	0 58 20.52	1.8923	11 56 29.7	11.527	14	2 31 45.10	2.0137	19 54 59.8	8.159
15	1 0 14.10	1.8938	12 7 59.7	11.472	15	2 33 46.02	2.0169	20 3 6.8	8.073
16	1 2 7.78	1.8955	12 19 26.4	11.417	16	2 35 47.13	2.0202	20 11 8.5	7.985
17	1 4 1.56	1.8971	12 30 49.7	11.361	17	2 37 48.44	2.0234	20 19 5.0	7.897
18	1 5 55.43	1.8988	12 42 9.7	11.304	18	2 39 49.94	2.0267	20 26 56.2	7.809
19	1 7 49.41	1.9006	12 53 26.2	11.246	19	2 41 51.64	2.0299	20 34 42.1	7.720
20	1 9 43.50	1.9023	13 4 39.2	11.188	20	2 43 53.53	2.0332	20 42 22.6	7.630
21	1 11 37.69	1.9042	13 15 48.8	11.130	21	2 45 55.62	2.0365	20 49 57.7	7.540
22	1 13 32.00	1.9061	13 26 54.8	11.070	22	2 47 57.91	2.0397	20 57 27.4	7.449
23	1 15 26.42	1.9080	N. 13 37 57.2	11.009	23	2 50 0.39	2.0430	N. 21 4 51.6	7.357
MONDAY 22.					WEDNESDAY 24.				
0	1 17 20.96	1.9100	N. 13 48 55.9	10.948	0	2 52 3.07	2.0463	N. 21 12 10.2	7.264
1	1 19 15.62	1.9121	13 59 51.0	10.887	1	2 54 5.95	2.0497	21 19 23.3	7.179
2	1 21 10.41	1.9142	14 10 42.4	10.826	2	2 56 9.03	2.0529	21 26 30.8	7.078
3	1 23 5.32	1.9163	14 21 30.1	10.763	3	2 58 12.30	2.0562	21 33 32.7	6.984
4	1 25 0.36	1.9184	14 32 14.0	10.700	4	3 0 15.77	2.0595	21 40 28.9	6.888
5	1 26 55.53	1.9207	14 42 54.1	10.636	5	3 2 19.44	2.0628	21 47 19.3	6.793
6	1 28 50.84	1.9230	14 53 30.3	10.571	6	3 4 23.31	2.0661	21 54 4.0	6.697
7	1 30 46.29	1.9253	15 4 2.6	10.506	7	3 6 27.37	2.0694	22 0 42.9	6.600
8	1 32 41.88	1.9276	15 14 31.0	10.441	8	3 8 31.63	2.0727	22 7 16.0	6.503
9	1 34 37.60	1.9299	15 24 55.5	10.374	9	3 10 36.09	2.0759	22 13 43.2	6.404
10	1 36 33.47	1.9324	15 35 15.9	10.307	10	3 12 40.74	2.0792	22 20 4.5	6.305
11	1 38 29.49	1.9348	15 45 32.3	10.239	11	3 14 45.59	2.0824	22 26 19.8	6.206
12	1 40 25.65	1.9373	15 55 44.6	10.171	12	3 16 50.63	2.0856	22 32 29.2	6.106
13	1 42 21.97	1.9399	16 5 52.8	10.102	13	3 18 55.86	2.0888	22 38 32.5	6.004
14	1 44 18.44	1.9425	16 15 56.8	10.032	14	3 21 1.28	2.0920	22 44 29.7	5.902
15	1 46 15.07	1.9452	16 25 56.6	9.961	15	3 23 6.90	2.0952	22 50 20.8	5.801
16	1 48 11.86	1.9478	16 35 52.1	9.889	16	3 25 12.71	2.0984	22 56 5.8	5.699
17	1 50 8.81	1.9505	16 45 43.3	9.818	17	3 27 18.71	2.1015	23 1 44.7	5.597
18	1 52 5.92	1.9533	16 55 30.3	9.746	18	3 29 24.89	2.1046	23 7 17.4	5.493
19	1 54 3.20	1.9561	17 5 12.9	9.673	19	3 31 31.26	2.1077	23 12 43.8	5.388
20	1 56 0.65	1.9588	17 14 51.1	9.599	20	3 33 37.82	2.1108	23 18 3.9	5.282
21	1 57 58.26	1.9616	17 24 24.8	9.524	21	3 35 44.56	2.1138	23 23 17.6	5.176
22	1 59 56.04	1.9645	17 33 54.0	9.449	22	3 37 51.48	2.1168	23 28 25.0	5.070
23	2 1 54.00	1.9674	17 43 18.7	9.374	23	3 39 58.58	2.1199	23 33 26.0	4.963
24	2 3 52.13	1.9703	N. 17 52 38.9	9.298	24	3 42 5.87	2.1229	N. 23 38 20.6	4.857

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 25.					SATURDAY 27.				
0	h m s	s	N. 23 38 20.6	4.857	0	h m s	s	N. 25 18 45.0	0.808
1	3 42 13.33	2.1258	23 43 8.8	4.749	1	5 26 36.66	2.2109	25 17 52.9	0.930
2	3 46 20.97	2.1287	23 47 50.5	4.640	2	5 28 49.33	2.2113	25 16 53.4	1.054
3	3 48 28.78	2.1316	23 52 25.6	4.530	3	5 31 2.02	2.2117	25 15 46.4	1.179
4	3 50 36.76	2.1344	23 56 54.1	4.420	4	5 33 14.73	2.2119	25 14 31.9	1.303
5	3 52 44.91	2.1373	24 1 16.0	4.310	5	5 35 27.45	2.2120	25 13 10.0	1.427
6	3 54 53.23	2.1401	24 5 31.3	4.200	6	5 37 40.17	2.2121	25 11 40.7	1.551
7	3 57 1.72	2.1428	24 9 40.0	4.089	7	5 39 52.90	2.2122	25 10 3.9	1.675
8	3 59 10.37	2.1455	24 13 42.0	3.977	8	5 42 5.63	2.2121	25 8 19.7	1.798
9	4 1 19.18	2.1482	24 17 37.2	3.864	9	5 44 18.35	2.2120	25 6 28.1	1.922
10	4 3 28.15	2.1508	24 21 25.7	3.752	10	5 46 31.07	2.2118	25 4 29.0	2.047
11	4 5 37.27	2.1533	24 25 7.4	3.639	11	5 48 43.77	2.2116	25 2 22.5	2.171
12	4 7 46.55	2.1559	24 28 42.4	3.526	12	5 50 56.46	2.2113	25 0 8.5	2.295
13	4 9 55.98	2.1584	24 32 10.5	3.411	13	5 53 9.13	2.2110	24 57 47.1	2.418
14	4 12 5.56	2.1608	24 35 31.7	3.297	14	5 55 21.78	2.2106	24 55 18.3	2.542
15	4 14 15.28	2.1632	24 38 46.1	3.182	15	5 57 34.40	2.2100	24 52 42.1	2.665
16	4 16 25.15	2.1656	24 41 53.5	3.065	16	5 59 46.98	2.2094	24 49 58.5	2.788
17	4 18 35.16	2.1679	24 44 53.9	2.949	17	6 1 59.53	2.2088	24 47 7.5	2.911
18	4 20 45.30	2.1702	24 47 47.4	2.833	18	6 4 12.04	2.2081	24 44 9.2	3.033
19	4 22 55.58	2.1724	24 50 33.9	2.716	19	6 6 24.50	2.2073	24 41 3.5	3.156
20	4 25 5.99	2.1745	24 53 13.3	2.598	20	6 8 36.92	2.2066	24 37 50.5	3.278
21	4 27 16.52	2.1766	24 55 45.7	2.481	21	6 10 49.29	2.2057	24 34 30.1	3.401
22	4 29 27.18	2.1787	24 58 11.0	2.363	22	6 13 1.60	2.2047	24 31 2.4	3.523
23	4 31 37.96	2.1807	N. 25 0 29.2	2.245	23	6 15 13.85	2.2037	N. 24 27 27.4	3.644
FRIDAY 26.					SUNDAY 28.				
0	4 33 48.86	2.1827	N. 25 2 40.4	2.127	0	6 17 26.04	2.2027	N. 24 27 27.4	3.644
1	4 35 59.88	2.1846	25 4 44.4	2.007	1	6 19 38.17	2.2016	N. 24 23 45.1	3.766
2	4 38 11.01	2.1863	25 6 41.2	1.887	2	6 21 50.23	2.2003	24 19 55.5	3.887
3	4 40 22.24	2.1881	25 8 30.8	1.767	3	6 24 2.21	2.1991	24 15 58.7	4.007
4	4 42 33.58	2.1898	25 10 13.2	1.647	4	6 26 14.12	2.1978	24 11 54.7	4.128
5	4 44 45.02	2.1915	25 11 48.4	1.527	5	6 28 25.95	2.1965	24 7 43.4	4.248
6	4 46 56.56	2.1931	25 13 16.4	1.406	6	6 30 37.70	2.1952	24 3 24.9	4.367
7	4 49 8.19	2.1946	25 14 37.1	1.284	7	6 32 49.37	2.1937	23 58 59.3	4.487
8	4 51 19.91	2.1961	25 15 50.5	1.162	8	6 35 0.95	2.1922	23 54 26.5	4.606
9	4 53 31.72	2.1975	25 16 56.6	1.041	9	6 37 12.43	2.1906	23 49 46.6	4.724
10	4 55 43.61	2.1988	25 17 55.4	0.919	10	6 39 23.82	2.1890	23 44 59.6	4.843
11	4 57 55.58	2.2002	25 18 46.9	0.797	11	6 41 35.11	2.1873	23 40 5.5	4.961
12	5 0 7.63	2.2014	25 19 31.1	0.675	12	6 43 46.30	2.1856	23 35 4.3	5.078
13	5 2 19.75	2.2026	25 20 7.9	0.552	13	6 45 57.38	2.1838	23 29 56.1	5.195
14	5 4 31.94	2.2037	25 20 37.4	0.430	14	6 48 8.36	2.1821	23 24 40.9	5.312
15	5 6 44.19	2.2047	25 20 59.5	0.307	15	6 50 19.23	2.1803	23 19 18.7	5.429
16	5 8 56.50	2.2056	25 21 14.2	0.183	16	6 52 29.98	2.1782	23 13 49.5	5.544
17	5 11 8.86	2.2065	25 21 21.5	+0.060	17	6 54 40.62	2.1763	23 8 13.4	5.659
18	5 13 21.28	2.2074	25 21 21.4	-0.063	18	6 56 51.14	2.1743	23 2 30.4	5.773
19	5 15 33.75	2.2082	25 21 13.9	0.187	19	6 59 1.54	2.1723	22 56 40.6	5.888
20	5 17 46.26	2.2088	25 20 59.0	0.311	20	7 1 11.82	2.1709	22 50 43.9	6.002
21	5 19 58.81	2.2095	25 20 36.6	0.435	21	7 3 21.97	2.1689	22 44 40.4	6.115
22	5 22 11.40	2.2101	25 20 6.8	0.558	22	7 5 32.00	2.1661	22 38 30.1	6.227
23	5 24 24.02	2.2105	25 19 29.6	0.682	23	7 7 41.90	2.1639	22 32 13.1	6.339
24	5 26 36.66	2.2109	N. 25 18 45.0	0.806	24	7 9 51.67	2.1617	22 25 49.4	6.451
						7 12 1.31	2.1595	N. 22 19 19.0	6.569

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 29.					WEDNESDAY 31.				
0	7 12 1.31	2.1595	N.22° 19' 19.0"	6.562	0	8 52 46.20	2.0380	N.15° 9' 1.9"	11.082
1	7 14 10.81	2.1572	22 12 42.0	6.679	1	8 54 48.41	2.0357	14 57 54.7	11.157
2	7 16 20.17	2.1549	22 5 58.4	6.783	2	8 56 50.49	2.0335	14 46 43.1	11.231
3	7 18 29.40	2.1526	21 59 8.1	6.883	3	8 58 52.43	2.0313	14 35 27.0	11.304
4	7 20 38.48	2.1502	21 52 11.3	7.001	4	9 0 54.24	2.0291	14 24 6.6	11.376
5	7 22 47.42	2.1477	21 45 8.0	7.108	5	9 2 55.92	2.0268	14 12 41.9	11.448
6	7 24 56.21	2.1453	21 37 58.3	7.216	6	9 4 57.46	2.0247	14 1 12.8	11.520
7	7 27 4.86	2.1429	21 30 42.1	7.323	7	9 6 58.88	2.0227	13 49 39.5	11.589
8	7 29 13.36	2.1404	21 23 19.5	7.429	8	9 9 0.18	2.0206	13 38 2.1	11.658
9	7 31 21.71	2.1380	21 15 50.6	7.534	9	9 11 1.35	2.0185	13 26 20.6	11.726
10	7 33 29.92	2.1355	21 8 15.4	7.639	10	9 13 2.40	2.0166	13 14 35.0	11.793
11	7 35 37.97	2.1339	21 0 33.9	7.743	11	9 15 3.34	2.0147	13 2 45.4	11.860
12	7 37 45.87	2.1304	20 52 46.2	7.847	12	9 17 4.16	2.0127	12 50 51.8	11.926
13	7 39 53.62	2.1278	20 44 52.3	7.950	13	9 19 4.86	2.0108	12 38 54.3	11.990
14	7 42 1.21	2.1254	20 36 52.2	8.052	14	9 21 5.46	2.0091	12 26 53.0	12.054
15	7 44 8.65	2.1227	20 28 46.0	8.153	15	9 23 5.95	2.0073	12 14 47.8	12.117
16	7 46 15.93	2.1201	20 20 33.8	8.254	16	9 25 6.33	2.0055	12 2 38.9	12.179
17	7 48 23.06	2.1175	20 12 15.5	8.355	17	9 27 6.61	2.0038	11 50 26.3	12.241
18	7 50 30.03	2.1148	20 3 51.2	8.454	18	9 29 6.79	2.0023	11 38 10.0	12.302
19	7 52 36.84	2.1129	19 55 21.0	8.553	19	9 31 6.87	2.0006	11 25 50.1	12.361
20	7 54 43.50	2.1097	19 46 44.9	8.651	20	9 33 6.86	1.9990	11 13 26.7	12.419
21	7 56 50.00	2.1070	19 38 2.9	8.748	21	9 35 6.75	1.9974	11 0 59.8	12.477
22	7 58 56.34	2.1043	19 29 15.1	8.845	22	9 37 6.55	1.9960	10 48 29.5	12.534
23	8 1 2.52	2.1017	N.19° 20' 21.5"	8.941	23	9 39 6.27	1.9946	N.10° 35' 55.8"	12.590
TUESDAY 30.					THURSDAY, JANUARY 1, 1880.				
0	8 3 8.54	2.0990	N.19° 11' 22.2"	9.036	0	9 41 5.90	1.9932	N.10° 23' 18.7"	12.645
1	8 5 14.40	2.0963	19 2 17.2	9.130					
2	8 7 20.10	2.0937	18 53 6.6	9.224					
3	8 9 25.65	2.0911	18 43 50.3	9.317					
4	8 11 31.03	2.0884	18 34 28.5	9.408					
5	8 13 36.25	2.0858	18 25 1.3	9.499					
6	8 15 41.32	2.0832	18 15 28.6	9.590					
7	8 17 46.23	2.0805	18 5 50.5	9.680					
8	8 19 50.98	2.0778	17 56 7.0	9.769					
9	8 21 55.57	2.0759	17 46 18.2	9.857					
10	8 24 0.01	2.0737	17 36 24.1	9.944					
11	8 26 4.29	2.0700	17 26 24.9	10.030					
12	8 28 8.41	2.0674	17 16 20.5	10.116					
13	8 30 12.38	2.0649	17 6 11.0	10.201					
14	8 32 16.20	2.0623	16 55 56.4	10.285					
15	8 34 19.86	2.0598	16 45 36.8	10.368					
16	8 36 23.37	2.0573	16 35 12.2	10.452					
17	8 38 26.74	2.0549	16 24 42.6	10.534					
18	8 40 29.96	2.0524	16 14 8.1	10.615					
19	8 42 33.03	2.0499	16 3 28.8	10.694					
20	8 44 35.95	2.0475	15 52 44.8	10.773					
21	8 46 38.73	2.0451	15 41 56.0	10.852					
22	8 48 41.36	2.0427	15 31 2.6	10.929					
23	8 50 43.85	2.0403	15 20 4.6	11.006					
24	8 52 46.20	2.0380	N.15° 9' 1.9"	11.082					

## PHASES OF THE MOON.

☾ Last Quarter, . . . 6 7 43.3  
 ● New Moon, . . . 12 23 4.4  
 ☽ First Quarter, . . . 19 23 15.6  
 ○ Full Moon, . . . 28 4 15.6

☾ Perigee, . . . . . 12 3.7  
 ☾ Apogee, . . . . . 24 15.5

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Arietis W.	61 55 4	3009	63 25 6	3003	64 55 15	2997	66 25 31	2991
	Mars W.	53 3 25	2998	54 35 8	2994	56 6 57	2918	57 38 53	2912
	Aldebaran W.	30 4 47	3183	31 31 16	3169	32 58 11	3149	34 25 30	3194
	Regulus E.	50 34 27	3005	49 4 21	3001	47 34 9	2996	46 3 51	2991
	Venus E.	104 35 9	3400	103 12 53	3394	101 50 30	3398	100 28 0	3383
	Spica E.	104 35 39	2994	103 5 19	2989	101 34 53	2983	100 4 19	2977
2	$\alpha$ Arietis W.	73 58 55	2958	75 30 1	2950	77 1 17	2942	78 32 43	2935
	Mars W.	65 20 25	2983	66 53 6	2976	68 25 56	2968	69 58 56	2961
	Aldebaran W.	41 47 6	3049	43 16 18	3036	44 45 46	3023	46 15 30	3010
	Regulus E.	38 30 51	2966	36 59 50	2962	35 28 55	2957	33 57 48	2951
	Spica E.	92 29 35	2946	90 58 14	2939	89 26 44	2931	87 55 4	2923
	Venus E.	93 33 45	3350	92 10 31	3342	90 47 8	3334	89 23 36	3327
3	$\alpha$ Arietis W.	86 12 23	2999	87 44 52	2983	89 17 33	2973	90 50 26	2965
	Mars W.	77 46 16	2983	79 20 14	2914	80 54 24	2905	82 26 45	2798
	Aldebaran W.	53 47 59	2951	55 19 13	2939	56 50 43	2927	58 22 28	2915
	Spica E.	80 14 15	2982	78 41 33	2973	77 8 40	2964	75 35 35	2954
	Venus E.	82 23 40	3264	80 59 10	3276	79 34 30	3266	78 9 39	3257
	Sun E.	129 5 32	3257	127 40 30	3247	126 15 16	3236	124 49 49	3225
4	Mars W.	90 23 34	2747	91 59 11	2736	93 35 3	2725	95 11 9	2715
	Aldebaran W.	66 5 2	2954	67 38 20	2941	69 11 55	2928	70 45 46	2916
	Pollux W.	24 29 46	2969	26 0 12	2957	27 31 19	2927	29 3 3	2901
	Spica E.	67 46 57	2903	66 12 33	2799	64 37 54	2780	63 3 0	2769
	Venus E.	71 2 30	3204	69 36 26	3193	68 10 9	3183	66 43 39	3172
	Sun E.	117 39 16	3167	116 12 27	3154	114 45 23	3141	113 18 3	3129
5	Aldebaran W.	78 39 15	2749	80 14 50	2735	81 50 44	2720	83 26 57	2707
	Pollux W.	36 49 31	2790	38 24 12	2770	39 59 19	2750	41 34 52	2731
	Spica E.	55 4 35	2707	53 28 4	2694	51 51 16	2681	50 14 10	2668
	Venus E.	59 27 39	3111	57 59 43	3098	56 31 31	3086	55 3 4	3073
	Sun E.	105 57 20	3059	104 28 20	3044	102 59 2	3029	101 29 25	3014
6	Pollux W.	49 38 49	2640	51 16 49	2622	52 55 14	2604	54 34 3	2586
	Spica E.	42 4 7	2698	40 25 9	2684	38 45 52	2669	37 6 15	2655
	Venus E.	47 36 56	3010	46 6 56	2997	44 36 40	2985	43 6 8	2973
	Sun E.	93 56 29	2934	92 24 53	2917	90 52 56	2900	89 20 37	2883
7	Pollux W.	62 54 14	2496	64 35 30	2481	66 17 10	2463	67 59 15	2446
	Regulus W.	25 52 42	2509	27 33 43	2486	29 15 16	2465	30 57 19	2444
	Venus E.	35 29 59	2923	33 58 9	2915	32 26 9	2909	30 54 2	2906
	Sun E.	81 33 34	2797	79 59 2	2779	78 24 6	2761	76 48 47	2743
8	Pollux W.	76 35 49	2360	78 20 21	2343	80 5 18	2326	81 50 39	2310
	Regulus W.	39 34 35	2349	41 19 23	2331	43 4 37	2313	44 50 17	2296
	Sun E.	68 46 15	2654	67 8 33	2637	65 30 28	2619	63 51 59	2602
9	Pollux W.	90 43 18	2229	92 30 58	2217	94 19 0	2203	96 7 24	2188
	Regulus W.	53 44 54	2213	55 33 2	2198	57 21 33	2183	59 10 26	2169
	Sun E.	55 33 44	2519	53 52 57	2503	52 11 48	2488	50 30 18	2472
10	Pollux W.	105 14 22	2127	107 4 40	2116	108 55 15	2106	110 46 5	2096

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVb.	P. L. of Diff.	XVIIIb.	P. L. of Diff.	XXIb.	P. L. of Diff.
1	$\alpha$ Arietis	W.	67 55 55	2984	69 26 28	2977	70 57 9	2971	72 27 58	2965
	Mars	W.	59 10 57	2906	60 43 8	2901	62 15 26	2894	63 47 52	2889
	Aldebaran	W.	35 53 11	3107	37 21 12	3091	38 49 32	3077	40 18 10	3069
	Regulus	E.	44 33 27	2986	43 2 57	2981	41 32 21	2977	40 1 39	2973
	Venus	E.	99 5 24	3377	97 42 41	3379	96 19 50	3363	94 56 51	3357
	Spica	E.	96 53 38	2971	97 2 49	2965	95 31 53	2958	94 0 48	2953
2	$\alpha$ Arietis	W.	80 4 18	2927	81 36 3	2918	83 7 59	2909	84 40 6	2901
	Mars	W.	71 32 5	2854	73 5 23	2846	74 38 51	2838	76 12 29	2831
	Aldebaran	W.	47 45 30	2998	49 15 45	2988	50 46 15	2974	52 17 0	2963
	Regulus	E.	32 26 34	2946	30 55 14	2942	29 23 49	2939	27 52 19	2935
	Spica	E.	86 23 14	2916	84 51 15	2908	83 19 6	2899	81 46 46	2891
	Venus	E.	87 59 56	3319	86 36 7	3311	85 12 8	3299	83 47 59	3294
3	$\alpha$ Arietis	W.	92 23 30	2855	93 56 47	2845	95 30 17	2834	97 4 1	2822
	Mars	W.	84 3 18	2787	85 38 3	2777	87 13 1	2768	88 48 11	2758
	Aldebaran	W.	59 54 28	2903	61 26 43	2891	62 59 14	2879	64 32 0	2868
	Spica	E.	74 2 17	2845	72 28 47	2835	70 55 4	2824	69 21 7	2814
	Venus	E.	76 44 37	3247	75 19 24	3237	73 53 59	3226	72 28 21	3215
	Sun	E.	123 24 10	3214	121 58 18	3203	120 32 12	3190	119 5 51	3178
4	Mars	W.	96 47 29	2704	98 24 4	2692	100 0 55	2680	101 38 2	2668
	Aldebaran	W.	72 19 53	2903	73 54 17	2789	75 28 59	2776	77 3 58	2763
	Pollux	W.	30 35 20	2976	32 8 9	2953	33 41 28	2931	35 15 16	2910
	Spica	E.	61 27 51	2757	59 52 27	2744	58 16 46	2732	56 40 49	2719
	Venus	E.	65 16 56	3180	63 49 59	3148	62 22 47	3135	60 55 20	3124
	Sun	E.	111 50 27	3114	110 22 35	3101	108 54 27	3087	107 26 2	3073
5	Aldebaran	W.	85 3 28	2993	86 40 19	2978	88 17 29	2963	89 54 59	2947
	Pollux	W.	43 10 51	2713	44 47 14	2695	46 24 1	2676	48 1 13	2658
	Spica	E.	48 36 47	2954	46 59 5	2940	45 21 5	2926	43 42 46	2912
	Venus	E.	53 34 22	3080	52 5 24	3047	50 36 10	3035	49 6 41	3022
	Sun	E.	99 59 29	2998	98 29 14	2989	96 58 39	2986	95 27 44	2980
6	Pollux	W.	56 13 17	2669	57 52 55	2651	59 32 57	2634	61 13 23	2616
	Spica	E.	35 26 18	2641	33 46 2	2627	32 5 26	2613	30 24 31	2609
	Venus	E.	41 35 21	2989	40 4 20	2951	38 33 6	2941	37 1 39	2931
	Sun	E.	87 47 57	2986	86 14 55	2949	84 41 30	2939	83 7 43	2915
7	Pollux	W.	69 41 44	2499	71 24 38	2411	73 7 57	2394	74 51 41	2377
	Regulus	W.	32 39 51	2494	34 22 51	2405	36 6 19	2386	37 50 14	2368
	Venus	E.	29 21 51	2905	27 49 38	2906	26 17 27	2912	24 45 23	2923
	Sun	E.	75 13 4	2725	73 36 57	2707	72 0 27	2689	70 23 33	2673
8	Pollux	W.	83 36 24	2394	85 22 33	2278	87 9 5	2263	88 56 0	2247
	Regulus	W.	46 36 23	2279	48 22 54	2263	50 9 50	2245	51 57 10	2229
	Sun	E.	62 13 7	2585	60 33 51	2567	58 54 11	2551	57 14 9	2535
9	Pollux	W.	97 56 9	2175	99 45 14	2163	101 34 38	2150	103 24 21	2138
	Regulus	W.	60 59 41	2154	62 49 18	2140	64 39 16	2127	66 29 34	2114
	Sun	E.	48 48 26	2458	47 6 14	2444	45 23 42	2431	43 40 51	2417
10	Pollux	W.	112 37 10	2088	114 28 28	2079	116 19 59	2072	118 11 41	2066



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Regulus	W.	68° 26' 12"	9101	70° 11' 9"	9090	72° 2' 24"	9079	73° 53' 56"	9068
	Sun	E.	41 57 41	9405	40 14 13	9393	38 30 29	9382	36 46 29	9372
15	Sun	W.	28 14 25	9497	29 55 43	9519	31 36 40	9528	33 17 14	9545
	Saturn	E.	77 35 25	9214	75 47 18	9231	73 59 36	9247	72 12 19	9264
	α Arietis	E.	104 14 38	9188	102 25 52	9203	100 37 29	9218	98 49 29	9235
16	Sun	W.	41 34 0	9537	43 12 5	9556	44 49 44	9576	46 26 56	9595
	Saturn	E.	63 22 33	9359	61 38 0	9380	59 53 56	9400	58 10 22	9421
	α Arietis	E.	89 55 47	9293	88 10 21	9341	86 25 21	9380	84 40 49	9379
	Mars	E.	97 13 20	9314	95 27 41	9333	93 42 29	9351	91 57 44	9370
17	Sun	W.	54 26 16	9798	56 0 47	9818	57 34 51	9838	59 8 29	9859
	Saturn	E.	49 40 5	9531	47 59 35	9555	46 19 38	9579	44 40 14	9602
	α Arietis	E.	76 4 57	9475	74 23 9	9494	72 41 48	9515	71 0 55	9534
	Mars	E.	83 20 57	9469	81 39 0	9489	79 57 31	9508	78 16 29	9528
18	Sun	W.	66 50 5	9960	68 21 8	9980	69 51 46	3000	71 21 59	3020
	α Aquilæ	W.	40 15 11	4165	41 24 10	4083	42 34 28	4013	43 45 55	3951
	Saturn	E.	36 31 36	9732	34 55 39	9760	33 20 19	9791	31 45 39	9823
	α Arietis	E.	62 43 12	9630	61 4 58	9649	59 27 10	9669	57 49 48	9687
	Mars	E.	69 58 9	9696	68 19 49	9645	66 41 55	9683	65 4 26	9693
	Aldebaran	E.	95 25 53	9660	93 48 19	9678	92 11 9	9695	90 34 23	9713
19	Sun	W.	78 47 10	3111	80 15 6	3139	81 42 40	3147	83 9 53	3163
	α Aquilæ	W.	49 56 22	3741	51 12 26	3712	52 29 0	3689	53 45 59	3669
	α Arietis	E.	49 49 9	9779	48 14 13	9798	46 30 40	9814	45 5 30	9831
	Mars	E.	57 3 12	9779	55 28 8	9789	53 53 26	9806	52 19 6	9823
	Aldebaran	E.	82 36 26	9800	81 1 58	9817	79 27 52	9834	77 54 8	9849
20	Sun	W.	90 21 6	3941	91 46 26	3955	93 11 30	3970	94 36 17	3983
	α Aquilæ	W.	60 15 27	3801	61 34 0	3894	62 52 41	3887	64 11 30	3881
	Jupiter	W.	22 50 55	3045	23 50 12	3045	25 19 29	3047	26 48 44	3050
	α Arietis	E.	37 20 13	9916	35 48 14	9933	34 16 37	9950	32 45 22	9967
	Mars	E.	44 32 40	9901	43 0 22	9915	41 28 22	9930	39 56 41	9943
	Aldebaran	E.	70 10 29	9926	68 38 43	9940	67 7 15	9954	65 36 5	9969
21	Sun	W.	101 36 27	3344	102 59 48	3354	104 22 57	3364	105 45 55	3373
	α Aquilæ	W.	70 46 42	3568	72 5 51	3567	73 25 1	3567	74 44 11	3568
	Fomalhaut	W.	46 17 9	3840	47 31 30	3808	48 46 24	3779	50 1 48	3753
	Jupiter	W.	34 13 42	3076	35 42 21	3069	37 10 53	3067	38 30 18	3064
	Mars	E.	32 22 28	3009	30 52 26	3021	29 22 39	3034	27 53 8	3046
	Aldebaran	E.	58 4 29	3033	56 34 57	3046	55 5 41	3058	53 36 40	3069
22	Sun	W.	112 38 8	3415	114 0 8	3429	115 22 0	3439	116 43 44	3454
	Fomalhaut	W.	56 24 44	3657	57 42 17	3643	59 0 5	3631	60 18 6	3620
	Jupiter	W.	45 59 34	3191	47 27 18	3198	48 54 56	3191	50 22 28	3185
	α Pegasi	W.	33 33 32	3514	34 53 41	3485	36 14 22	3460	37 35 31	3438
	Aldebaran	E.	46 15 9	3198	44 47 33	3139	43 20 11	3151	41 53 3	3163
	Pollux	E.	87 55 15	3092	86 26 19	3089	84 57 32	3075	83 28 52	3061
23	Sun	W.	123 30 58	3457	124 52 10	3469	126 13 19	3463	127 34 25	3465
	Fomalhaut	W.	66 51 4	3579	68 10 9	3565	69 29 22	3557	70 48 43	3551

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Regulus W. Sun E.	75° 45' 44" 35 2 14	9058 9362	77° 37' 48" 33 17 44	9049 9353	79° 30' 6" 31 33 1	9040 9345	81° 22' 38" 29 48 7	9039 9338
15	Sun W. Saturn E. α Arietis E.	34 57 24 70 25 27 97 1 54	9563 9283 9259	36 37 10 68 39 2 95 14 44	9580 9309 9269	38 16 32 66 53 5 93 27 59	9599 9390 9287	39 55 29 65 7 35 91 41 40	9616 9349 9304
16	Sun W. Saturn E. α Arietis E. Mars E.	48 3 42 56 27 17 82 56 44 90 13 26	9716 9443 9398 9389	49 40 1 54 44 43 81 13 6 88 29 36	9736 9464 9417 9410	51 15 53 53 2 39 79 29 56 86 46 15	9756 9486 9436 9429	52 51 18 51 21 6 77 47 13 85 3 22	9777 9509 9455 9449
17	Sun W. Saturn E. α Arietis E. Mars E.	60 41 40 43 1 22 69 20 29 76 35 55	9880 9696 9553 9548	62 14 25 41 23 3 67 40 30 74 55 48	9900 9659 9573 9567	63 46 44 39 45 19 66 0 58 73 16 8	9920 9678 9592 9587	65 18 37 38 8 10 64 21 52 71 36 55	9940 9705 9611 9607
18	Sun W. α Aquilæ W. Saturn E. α Arietis E. Mars E. Aldebaran E.	72 51 47 44 58 23 30 11 41 56 12 51 63 27 23 88 58 1	3039 3897 2856 9706 9701 9739	74 21 12 46 11 46 28 38 26 54 36 19 61 50 44 87 22 3	3057 3850 2893 9725 9719 9749	75 50 14 47 25 57 27 5 57 53 0 12 60 14 30 85 46 28	3076 3808 2931 9743 9737 9766	77 18 53 48 40 51 25 34 18 51 24 29 58 38 39 84 11 16	3094 3779 2974 9760 9755 9783
19	Sun W. α Aquilæ W. α Arietis E. Mars E. Aldebaran E.	84 36 46 55 3 19 43 31 43 50 45 8 76 20 44	3179 3651 9848 9839 9866	86 3 20 56 20 58 41 58 18 49 11 31 74 47 41	3196 3635 9866 9855 9881	87 29 34 57 38 54 40 25 15 47 38 14 73 14 58	3212 3622 9892 9870 9896	88 55 29 58 57 4 38 52 33 46 5 17 71 42 34	3227 3610 9899 9886 9911
20	Sun W. α Aquilæ W. Jupiter W. α Arietis E. Mars E. Aldebaran E.	96 0 48 65 30 25 28 17 55 31 14 28 38 25 17 64 5 13	3226 3576 3054 9985 9957 9969	97 25 4 66 49 25 29 47 1 29 43 56 36 54 10 62 34 38	3309 3574 3058 3002 9970 9995	98 49 5 68 8 28 31 16 2 28 13 46 35 23 20 61 4 19	3320 3571 3064 3091 9983 3008	100 12 53 69 27 34 32 44 56 26 43 59 33 52 46 59 34 16	3332 3569 3070 3041 9996 3021
21	Sun W. α Aquilæ W. Fomalhaut W. Jupiter W. Mars E. Aldebaran E.	107 8 42 76 3 20 51 17 39 40 7 35 26 23 52 52 7 53	3383 3568 3730 3100 3058 3092	108 31 18 77 22 29 52 33 54 41 35 45 24 54 51 50 39 21	3392 3570 3709 3105 3070 3093	109 53 44 78 41 36 53 50 31 43 3 48 23 26 5 49 11 3	3400 3572 3691 3111 3092 3105	111 16 0 80 0 41 55 7 28 44 31 44 21 57 34 47 42 59	3408 3574 3673 3116 3096 3116
22	Sun W. Fomalhaut W. Jupiter W. α Pegasi W. Aldebaran E. Pollux E.	118 5 22 61 36 19 51 49 55 38 57 4 40 26 9 82 0 19	3439 3609 3139 3419 3175 3066	119 26 54 62 54 44 53 17 17 40 18 59 38 59 30 80 31 52	3444 3598 3143 3401 3188 3091	120 48 21 64 13 20 54 44 35 41 41 14 37 33 7 79 3 31	3449 3596 3146 3386 3601 3096	122 9 42 65 32 7 56 11 49 43 3 47 36 6 59 77 35 16	3454 3579 3149 3379 3215 3100
23	Sun W. Fomalhaut W.	128 55 28 72 8 11	3467 3545	130 16 29 73 27 46	3469 3539	131 37 28 74 47 27	3470 3535	132 58 26 76 7 13	3471 3530

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	Jupiter W.	57 38 59	3159	59 6 6	3154	60 33 10	3156	62 0 12	3158
	α Pegasi W.	44 26 36	3359	45 49 39	3348	47 12 55	3338	48 36 23	3336
	Saturn W.	26 57 0	3966	28 21 51	3951	29 47 0	3939	31 12 23	3929
	Aldebaran E.	34 41 8	3931	33 15 35	3947	31 50 22	3965	30 25 30	3955
	Pollux E.	76 7 6	3104	74 39 1	3107	73 11 0	3110	71 43 2	3112
24	Fomalhaut W.	77 27 4	3595	78 47 0	3580	80 7 2	3515	81 27 9	3511
	Jupiter W.	69 14 58	3169	70 41 53	3161	72 8 49	3160	73 35 46	3160
	α Pegasi W.	55 36 17	3288	57 0 43	3289	58 25 16	3275	59 49 57	3269
	Saturn W.	38 22 0	3190	39 48 21	3184	41 14 49	3178	42 41 24	3173
	Pollux E.	64 23 58	3192	62 56 15	3194	61 28 34	3194	60 0 55	3196
25	Fomalhaut W.	88 8 45	3496	89 29 14	3493	90 49 46	3491	92 10 20	3489
	Jupiter W.	80 50 48	3159	82 17 55	3149	83 45 5	3147	85 12 18	3144
	α Pegasi W.	66 55 10	3929	68 20 33	3923	69 46 3	3927	71 11 40	3921
	Saturn W.	49 55 54	3148	51 23 6	3143	52 50 24	3138	54 17 48	3134
	α Arietis W.	23 19 43	3175	24 46 22	3161	26 13 18	3148	27 40 29	3138
	Pollux E.	52 42 48	3197	51 15 11	3197	49 47 34	3198	48 19 58	3198
	Regulus E.	89 27 12	3089	87 58 41	3080	86 30 7	3078	85 1 30	3074
26	Jupiter W.	92 29 17	3197	93 56 54	3193	95 24 36	3119	96 52 23	3114
	α Pegasi W.	78 21 25	3184	79 47 41	3188	81 14 4	3183	82 40 34	3178
	Saturn W.	61 36 18	3107	63 4 19	3101	64 32 27	3096	66 0 41	3091
	α Arietis W.	34 59 15	3096	36 27 30	3088	37 55 54	3081	39 24 27	3074
	Mars W.	26 52 24	3120	28 20 9	3114	29 48 1	3109	31 16 0	3108
	Pollux E.	41 2 0	3129	39 34 26	3131	38 6 54	3133	36 39 24	3135
	Regulus E.	77 37 29	3058	76 8 28	3054	74 39 22	3050	73 10 11	3045
27	Saturn W.	73 23 35	3069	74 52 31	3056	76 21 34	3050	77 50 45	3044
	α Arietis W.	46 49 19	3039	48 18 43	3033	49 48 15	3026	51 17 55	3019
	Mars W.	38 37 44	3073	40 6 26	3068	41 35 15	3062	43 4 11	3056
	Regulus E.	65 42 52	3069	64 13 7	3017	62 43 15	3019	61 13 17	3006
28	Saturn W.	85 18 31	3013	86 48 28	3007	88 18 32	3001	89 48 44	2994
	α Arietis W.	58 48 25	2985	60 18 57	2978	61 49 37	2971	63 20 26	2964
	Mars W.	50 30 44	3026	52 0 24	3019	53 30 13	3013	55 0 10	3006
	Aldebaran W.	27 6 12	3209	28 32 19	3173	29 59 0	3148	31 26 12	3125
	Regulus E.	53 41 47	2980	52 11 9	2974	50 40 24	2969	49 9 32	2963
	Spica E.	107 43 23	2970	106 12 33	2964	104 41 35	2957	103 10 29	2950
29	α Arietis W.	70 56 43	2929	72 28 25	2921	74 0 17	2914	75 32 18	2907
	Mars W.	62 31 55	2974	64 2 40	2967	65 33 34	2961	67 4 36	2954
	Aldebaran W.	38 48 22	3035	40 17 51	3021	41 47 38	3007	43 17 42	2994
	Regulus E.	41 33 27	2935	40 1 53	2931	38 30 13	2926	36 58 27	2920
	Spica E.	95 32 52	2917	94 0 55	2910	92 28 49	2904	90 56 35	2896
30	Mars W.	74 41 59	2919	76 13 54	2919	77 45 58	2904	79 18 12	2897
	Aldebaran W.	50 51 55	2935	52 23 29	2924	53 55 17	2913	55 27 19	2903
	Spica E.	83 13 5	2960	81 39 55	2953	80 6 36	2945	78 33 7	2938
31	Mars W.	87 1 42	2959	88 34 53	2959	90 8 14	2943	91 41 46	2935
	Aldebaran W.	63 10 40	2954	64 43 58	2944	66 17 29	2935	67 51 12	2925
	Spica E.	70 43 14	2799	69 8 45	2792	67 34 6	2784	65 59 17	2775

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
23	Jupiter	W.	63° 27' 12"	3159	64° 54' 10"	3160	66° 21' 7"	3161	67° 48' 3"	3162
	α Pegasi	W.	50 0 2	3319	51 23 51	3311	52 47 50	3302	54 11 59	3304
	Saturn	W.	32 37 58	3220	34 3 44	3211	35 29 40	3203	36 55 46	3196
	Aldebaran	E.	29 1 1	3307	27 36 58	3339	26 13 24	3362	24 50 24	3366
	Pollux	E.	70 15 7	3115	68 47 16	3118	67 19 28	3119	65 51 42	3191
24	Fomalhaut	W.	82 47 21	3507	84 7 37	3505	85 27 56	3501	86 48 19	3498
	Jupiter	W.	75 2 43	3159	76 29 41	3158	77 56 41	3156	79 23 43	3153
	α Pegasi	W.	61 14 45	3262	62 39 41	3266	64 4 44	3250	65 29 54	3245
	Saturn	W.	44 8 6	3168	45 34 54	3163	47 1 48	3158	48 28 48	3153
	Pollux	E.	58 33 17	3196	57 5 39	3197	55 38 2	3197	54 10 25	3197
25	Fomalhaut	W.	93 30 56	3488	94 51 34	3486	96 12 14	3485	97 32 55	3484
	Jupiter	W.	86 39 34	3143	88 6 53	3138	89 34 16	3134	91 1 44	3130
	α Pegasi	W.	72 37 24	3216	74 3 14	3210	75 29 11	3204	76 55 15	3199
	Saturn	W.	55 45 17	3192	57 12 52	3193	58 40 34	3117	60 8 23	3119
	α Arietis	W.	29 7 53	3199	30 35 28	3119	32 3 14	3111	33 31 10	3104
	Pollux	E.	46 52 22	3198	45 24 46	3198	43 57 10	3199	42 29 35	3199
	Regulus	E.	83 32 49	3079	82 4 5	3069	80 35 17	3065	79 6 25	3062
26	Jupiter	W.	98 20 15	3110	99 48 13	3105	101 16 16	3101	102 44 24	3096
	α Pegasi	W.	84 7 10	3173	85 33 53	3167	87 0 42	3162	88 27 37	3156
	Saturn	W.	67 29 2	3068	68 57 29	3079	70 26 4	3073	71 54 46	3068
	α Arietis	W.	40 53 8	3067	42 21 58	3060	43 50 57	3053	45 20 4	3047
	Mars	W.	32 44 7	3096	34 12 21	3091	35 40 42	3085	37 9 10	3080
	Pollux	E.	35 11 57	3138	33 44 34	3143	32 17 16	3148	30 50 4	3153
	Regulus	E.	71 40 54	3041	70 11 32	3036	68 42 4	3032	67 12 31	3027
27	Saturn	W.	79 20 3	3038	80 49 28	3032	82 19 1	3026	83 48 42	3019
	α Arietis	W.	52 47 44	3013	54 17 41	3005	55 47 47	2998	57 18 2	2992
	Mars	W.	44 33 15	3050	46 2 26	3043	47 31 45	3038	49 1 11	3032
	Regulus	E.	59 43 12	3001	58 13 1	2996	56 42 43	2990	55 12 18	2985
28	Saturn	W.	91 19 4	2988	92 49 32	2981	94 20 8	2975	95 50 52	2969
	α Arietis	W.	64 51 24	2957	66 22 31	2950	67 53 46	2943	69 25 10	2936
	Mars	W.	56 30 15	3000	58 0 28	2993	59 30 49	2987	61 1 18	2981
	Aldebaran	W.	32 53 51	3105	34 21 55	3095	35 50 23	3088	37 19 12	3081
	Regulus	E.	47 38 33	2958	46 7 27	2952	44 36 14	2946	43 4 54	2941
	Spica	E.	101 39 14	2944	100 7 51	2938	98 36 20	2931	97 4 40	2924
29	α Arietis	W.	77 4 28	2900	78 36 47	2892	80 9 16	2885	81 41 54	2877
	Mars	W.	68 35 47	2946	70 7 7	2939	71 38 36	2933	73 10 13	2926
	Aldebaran	W.	44 48 2	2981	46 18 38	2969	47 49 29	2958	49 20 35	2946
	Regulus	E.	35 26 34	2916	33 54 35	2912	32 22 31	2908	30 50 22	2904
	Spica	E.	89 24 11	2899	87 51 38	2892	86 18 56	2875	84 46 5	2868
30	Mars	W.	80 50 35	2899	82 23 8	2892	83 55 50	2875	85 28 41	2867
	Aldebaran	W.	56 59 34	2923	58 32 2	2923	60 4 42	2913	61 37 35	2904
	Spica	E.	76 59 28	2930	75 25 39	2923	73 51 41	2915	72 17 33	2907
31	Mars	W.	93 15 28	2897	94 49 21	2819	96 23 24	2811	97 57 37	2803
	Aldebaran	W.	69 25 8	2815	70 59 16	2805	72 33 37	2796	74 8 10	2788
	Spica	E.	64 24 17	2767	62 49 6	2759	61 13 44	2750	59 38 11	2743

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.		
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.				
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m			
1 19 14 59.55	+13.617	23 17 11.0	+19.48	0 31.9		1 21 55 24.72	+12.144	14 14 40.0	+63.61	1 10.1			
2 19 20 26.02	13.587	23 9 2.0	21.96	0 33.4		2 22 0 15.59	12.094	13 49 1.8	64.56	1 11.0			
3 19 25 51.75	13.555	23 0 10.5	23.03	0 34.9		3 22 5 5.27	12.045	13 23 1.4	65.47	1 11.9			
4 19 31 16.69	13.522	22 50 36.8	24.78	0 36.4		4 22 9 53.79	11.998	12 56 39.5	66.36	1 12.8			
5 19 36 40.79	13.487	22 40 21.3	26.51	0 37.9		5 22 14 41.18	11.951	12 29 57.0	67.19	1 13.7			
6 19 42 4.01	13.449	22 29 24.4	28.22	0 39.4		6 22 19 27.45	11.905	12 2 54.6	68.01	1 14.5			
7 19 47 26.29	13.409	22 17 46.6	29.92	0 40.8		7 22 24 12.64	11.860	11 35 33.0	68.79	1 15.3			
8 19 52 47.60	13.367	22 5 28.4	31.60	0 42.2		8 22 28 56.77	11.817	11 7 53.1	69.54	1 16.1			
9 19 58 7.90	13.325	21 52 30.2	33.25	0 43.6		9 22 33 39.89	11.776	10 39 55.6	70.25	1 16.9			
10 20 3 27.16	13.281	21 58 52.6	31.88	0 45.0		10 22 38 22.02	11.735	10 11 41.2	70.94	1 17.6			
11 20 8 45.35	13.235	21 24 36.1	36.49	0 46.3		11 22 43 3.19	11.696	9 43 10.8	71.60	1 18.4			
12 20 14 2.43	13.188	21 9 41.3	38.06	0 47.6		12 22 47 43.45	11.659	9 14 25.1	72.22	1 19.1			
13 20 19 18.37	13.140	20 54 8.8	39.63	0 48.9		13 22 52 22.84	11.623	8 45 24.9	72.80	1 19.8			
14 20 24 33.15	13.092	20 37 59.3	41.16	0 50.2		14 22 57 1.38	11.588	8 16 11.0	73.36	1 20.5			
15 20 29 46.75	13.042	20 21 13.4	42.67	0 51.5		15 23 1 39.10	11.555	7 46 44.0	73.88	1 21.2			
16 20 34 59.13	12.991	20 3 51.7	44.15	0 52.8		16 23 6 16.05	11.523	7 17 4.8	74.36	1 21.8			
17 20 40 10.29	12.939	19 45 54.7	45.60	0 54.0		17 23 10 52.27	11.494	6 47 14.2	74.84	1 22.5			
18 20 45 20.21	12.887	19 27 23.2	47.02	0 55.3		18 23 15 27.80	11.465	6 17 12.9	75.27	1 23.1			
19 20 50 28.87	12.834	19 8 18.1	48.41	0 56.5		19 23 20 2.66	11.439	5 47 1.6	75.67	1 23.8			
20 20 55 36.26	12.781	18 48 40.0	49.77	0 57.7		20 23 24 36.90	11.414	5 16 41.3	76.03	1 24.5			
21 21 0 42.38	12.727	18 28 29.5	51.11	0 58.8		21 23 29 10.55	11.391	4 46 12.6	76.36	1 25.1			
22 21 5 47.20	12.674	18 7 47.3	52.40	0 59.9		22 23 33 43.66	11.369	4 15 36.3	76.66	1 25.7			
23 21 10 50.73	12.620	17 46 34.4	53.67	1 1.0		23 23 38 10.27	11.349	3 44 53.2	76.93	1 26.3			
24 21 15 52.96	12.566	17 24 51.4	54.91	1 2.1		24 23 42 48.41	11.330	3 14 4.1	77.17	1 26.9			
25 21 20 53.90	12.512	17 2 39.3	56.12	1 3.2		25 23 47 20.12	11.313	2 43 9.6	77.38	1 27.5			
26 21 25 53.55	12.458	16 39 58.7	57.29	1 4.3		26 23 51 51.45	11.298	2 12 10.6	77.55	1 28.1			
27 21 30 51.91	12.404	16 16 50.3	58.43	1 5.3		27 23 56 22.42	11.284	1 41 7.9	77.69	1 28.7			
28 21 35 48.99	12.351	15 53 14.9	59.53	1 6.3		28 0 0 53.08	11.273	1 10 2.2	77.79	1 29.2			
29 21 40 44.79	12.298	15 29 13.4	60.60	1 7.3		29 0 5 23.49	11.262	0 38 54.1	77.87	1 29.8			
30 21 45 39.34	12.246	15 4 46.6	61.63	1 8.3		30 0 9 53.67	11.253	0 7 44.5	77.92	1 30.3			
31 21 50 32.64	12.193	14 39 55.2	62.64	1 9.2		31 0 14 23.67	11.246	0 23 25.8	77.94	1 30.9			
32 21 55 24.72	+12.144	14 14 40.0	+63.61	1 10.1		32 0 18 53.53	+11.241	0 54 36.3	+77.93	1 31.4			
Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.
Semidiameter	5.0	5.1	5.1	5.1	5.1	5.2	5.2	Semidiameter	5.2	5.3	5.3	5.4	5.4
Hor. Parallax	5.2	5.2	5.3	5.3	5.3	5.3	5.4	Hor. Parallax	5.4	5.5	5.5	5.5	5.6

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

MARCH.						APRIL.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
1	h m s	s	° ' "	"	h m	1	h m s	s	° ' "	"	m h		
1	0 5 23.49	+11.203	0 38 54.1	+77.87	1 29.8	1	2 26 41.15	+11.773	+14 38 40.0	+65.19	1 48.8		
2	0 9 53.67	11.253	0 7 44.5	77.92	1 30.3	2	2 31 24.13	11.810	15 4 33.9	64.39	1 49.6		
3	0 14 23.67	11.946	0 23 25.8	77.94	1 30.9	3	2 36 8.02	11.848	15 30 5.7	63.35	1 50.4		
4	0 18 53.53	11.941	0 54 36.3	77.93	1 31.4	4	2 40 52.83	11.887	15 55 14.8	62.39	1 51.2		
5	0 23 23.29	11.938	1 25 46.1	77.89	1 32.0	5	2 45 38.58	11.927	16 20 0.4	61.40	1 52.0		
6	0 27 53.00	11.937	1 56 54.5	77.81	1 32.6	6	2 50 25.29	11.967	16 44 21.7	60.38	1 52.8		
7	0 32 22.69	11.938	2 28 0.7	77.71	1 33.1	7	2 55 12.96	12.007	17 8 18.1	59.39	1 53.7		
8	0 36 52.42	11.940	2 59 4.1	77.58	1 33.7	8	3 0 1.60	12.048	17 31 48.8	58.94	1 54.6		
9	0 41 22.22	11.945	3 30 4.0	77.41	1 34.3	9	3 4 51.23	12.089	17 54 53.2	57.13	1 55.5		
10	0 45 52.16	11.951	4 0 59.6	77.29	1 34.8	10	3 9 41.86	12.131	18 17 30.6	55.98	1 56.4		
11	0 50 22.27	11.959	4 31 50.2	76.99	1 35.4	11	3 14 33.50	12.173	18 39 40.2	54.81	1 57.3		
12	0 54 52.58	11.969	5 2 35.1	76.74	1 35.9	12	3 19 26.16	12.215	19 1 21.4	53.61	1 58.2		
13	0 59 23.13	11.980	5 33 13.6	76.46	1 36.5	13	3 24 19.82	12.257	19 22 33.4	52.38	1 59.2		
14	1 3 53.97	11.993	6 3 45.0	76.15	1 37.1	14	3 29 14.49	12.299	19 43 15.6	51.19	2 0.2		
15	1 8 25.15	11.307	6 34 8.5	75.80	1 37.7	15	3 34 10.17	12.341	20 3 27.3	49.83	2 1.2		
16	1 12 56.71	11.323	7 4 23.4	75.42	1 38.2	16	3 39 6.85	12.382	20 23 7.8	48.52	2 2.2		
17	1 17 28.67	11.341	7 34 28.9	75.02	1 38.8	17	3 44 4.52	12.423	20 42 16.5	47.18	2 3.2		
18	1 22 1.09	11.361	8 4 24.3	74.59	1 39.4	18	3 49 3.16	12.463	21 0 52.6	45.81	2 4.2		
19	1 26 34.00	11.382	8 34 8.9	74.12	1 40.0	19	3 54 2.76	12.503	21 18 55.6	44.42	2 5.2		
20	1 31 7.44	11.405	9 3 41.9	73.63	1 40.6	20	3 59 3.31	12.542	21 36 25.1	43.00	2 6.2		
21	1 35 41.45	11.430	9 33 2.5	73.10	1 41.2	21	4 4 4.78	12.580	21 53 20.2	41.56	2 7.3		
22	1 40 16.05	11.455	10 2 10.1	72.54	1 41.8	22	4 9 7.14	12.617	22 9 40.3	40.10	2 8.4		
23	1 44 51.27	11.481	10 31 3.8	71.94	1 42.5	23	4 14 10.37	12.652	22 25 24.8	38.60	2 9.6		
24	1 49 27.15	11.509	10 59 42.9	71.39	1 43.1	24	4 19 14.43	12.686	22 40 33.2	37.08	2 10.7		
25	1 54 3.71	11.538	11 28 6.7	70.67	1 43.8	25	4 24 19.28	12.718	22 55 4.9	35.55	2 11.9		
26	1 58 40.99	11.569	11 56 14.5	69.99	1 44.4	26	4 29 24.88	12.748	23 8 50.5	34.00	2 13.0		
27	2 3 19.02	11.600	12 24 5.3	69.27	1 45.1	27	4 34 31.20	12.777	23 22 16.4	32.42	2 14.2		
28	2 7 57.81	11.632	12 51 38.4	68.51	1 45.8	28	4 39 38.19	12.804	23 34 55.2	30.82	2 15.4		
29	2 12 37.40	11.667	13 18 53.2	67.72	1 46.5	29	4 44 45.80	12.830	23 46 55.4	29.30	2 16.6		
30	2 17 17.80	11.702	13 45 48.9	66.91	1 47.3	30	4 49 53.99	12.853	23 58 16.7	27.57	2 17.8		
31	2 21 59.05	11.737	14 12 24.8	66.07	1 48.0	31	4 55 2.71	12.874	24 8 58.6	25.93	2 19.0		
32	2 26 41.15	+11.773	+14 38 40.0	+65.19	1 48.8	32	5 0 11.92	+12.893	+24 19 0.7	+24.26	2 20.2		
Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter	5.5	5.5	5.6	5.7	5.8	5.9	Semidiameter	6.0	6.1	6.2	6.3	6.4	6.6
Hor. Parallax	5.7	5.7	5.8	5.9	6.0	6.1	Hor. Parallax	6.2	6.3	6.4	6.5	6.7	6.8

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m			
1	4 55 2.71	+12.874	+24 8 58.6	+25.93	2 19.0	1	7 33 36.07	+12.971	+24 0 34.8	-26.62	2 55.4			
2	5 0 11.92	12.893	24 19 0.7	94.26	2 20.2	2	7 38 29.83	12.210	23 49 37.8	28.14	2 56.1			
3	5 5 21.57	12.910	24 28 22.7	92.58	2 21.4	3	7 43 22.11	12.147	23 38 4.6	29.64	2 57.2			
4	5 10 31.60	12.925	24 37 4.2	90.89	2 22.6	4	7 48 12.87	12.083	23 25 55.8	31.11	2 58.1			
5	5 15 41.94	12.937	24 45 5.1	19.18	2 23.9	5	7 53 2.05	12.017	23 13 11.9	32.56	2 59.0			
6	5 20 52.56	12.947	24 52 25.0	17.47	2 25.1	6	7 57 49.62	11.940	22 59 53.5	33.98	2 59.8			
7	5 26 3.38	12.955	24 59 3.7	15.75	2 26.4	7	8 2 35.56	11.879	22 46 1.2	35.38	3 0.6			
8	5 31 14.34	12.960	25 5 0.9	14.02	2 27.6	8	8 7 19.82	11.808	22 31 35.5	36.76	3 1.4			
9	5 36 25.40	12.962	25 10 16.5	12.28	2 28.9	9	8 12 2.37	11.736	22 16 37.2	38.11	3 2.2			
10	5 41 36.49	12.961	25 14 50.3	10.54	2 30.1	10	8 16 43.17	11.664	22 1 6.8	39.43	3 2.9			
11	5 46 47.54	12.959	25 18 42.2	8.79	2 31.3	11	8 21 22.22	11.590	21 45 5.0	40.73	3 3.6			
12	5 51 58.50	12.954	25 21 52.2	7.05	2 32.5	12	8 25 59.48	11.515	21 28 32.4	41.99	3 4.3			
13	5 57 9.31	12.946	25 24 20.2	5.30	2 33.8	13	8 30 34.93	11.439	21 11 29.8	43.23	3 4.9			
14	6 2 19.90	12.936	25 26 6.2	3.54	2 35.0	14	8 35 8.54	11.363	20 53 57.8	44.43	3 5.5			
15	6 7 30.20	12.923	25 27 10.1	1.79	2 36.3	15	8 39 40.29	11.284	20 35 57.1	45.61	3 6.1			
16	6 12 40.14	12.906	25 27 31.9	+ 0.03	2 37.5	16	8 44 10.16	11.206	20 17 28.3	46.77	3 6.6			
17	6 17 49.67	12.887	25 27 11.7	- 1.72	2 38.7	17	8 48 38.12	11.126	19 58 32.3	47.90	3 7.1			
18	6 22 58.71	12.865	25 26 9.6	3.46	2 39.9	18	8 53 4.15	11.045	19 39 9.6	49.00	3 7.6			
19	6 28 7.19	12.841	25 24 25.7	5.19	2 41.1	19	8 57 28.25	10.963	19 19 21.0	50.06	3 8.1			
20	6 33 15.04	12.813	25 22 0.2	6.92	2 42.3	20	9 1 50.38	10.881	18 59 7.3	51.09	3 8.5			
21	6 38 22.20	12.783	25 18 53.5	8.64	2 43.5	21	9 6 10.54	10.798	18 38 29.2	52.09	3 8.9			
22	6 43 28.60	12.749	25 15 5.6	10.36	2 44.7	22	9 10 28.69	10.714	18 17 27.5	53.06	3 9.3			
23	6 48 34.19	12.713	25 10 36.7	12.06	2 45.8	23	9 14 44.81	10.630	17 56 3.0	53.99	3 9.7			
24	6 53 38.83	12.674	25 5 27.2	13.74	2 46.9	24	9 18 58.92	10.545	17 34 16.5	54.89	3 10.0			
25	6 58 42.53	12.632	24 59 37.4	15.40	2 48.0	25	9 23 11.01	10.460	17 12 8.8	55.76	3 10.2			
26	7 3 45.20	12.588	24 53 7.8	17.06	2 49.1	26	9 27 21.04	10.374	16 49 40.5	56.60	3 10.4			
27	7 8 46.76	12.541	24 45 58.6	18.70	2 50.1	27	9 31 28.97	10.288	16 26 52.4	57.40	3 10.6			
28	7 13 47.17	12.492	24 38 10.3	20.32	2 51.2	28	9 35 34.80	10.201	16 3 45.4	58.17	3 10.7			
29	7 18 46.36	12.440	24 29 43.3	21.93	2 52.3	29	9 39 38.54	10.113	15 40 20.2	58.91	3 10.8			
30	7 23 44.28	12.386	24 20 38.0	23.52	2 53.4	30	9 43 40.18	10.025	15 16 37.7	59.63	3 10.9			
31	7 28 40.86	12.330	24 10 55.0	25.08	2 54.4	31	9 47 39.70	9.936	14 52 38.5	60.31	3 11.0			
32	7 33 36.07	+12.971	-24 0 34.8	-26.62	2 55.4	32	9 51 37.09	+ 9.847	+14 28 23.4	-60.96	3 11.0			
Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
Semidiameter	6.8	6.9	7.1	7.3	7.6	7.8	8.1	Semidiameter	8.4	8.7	9.1	9.4	9.9	10.4
Hor. Parallax	7.0	7.2	7.4	7.6	7.8	8.1	8.4	Hor. Parallax	8.7	9.0	9.4	9.8	10.2	10.6

NOTE.—North declinations are marked +, south declinations—.

## GREENWICH MEAN TIME.

### JULY.

### AUGUST.

Day of Month.	Apparent Right Ascension.			Var. of R. A. for 1 Hour.	Apparent Declination.			Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.			Var. of R. A. for 1 Hour.	Apparent Declination.			Var. of Dec. for 1 Hour.	Meridian Passage.				
	h	m	s	"	°	'	"	"			h	m	s	"	°	'	"	"					
1	9	47	39.70	+9.936	14	52	38.5	-60.31	3 11.0	1	11	32	39.87	+6.789	+1	19	0.8	-65.67	2 53.6				
2	9	51	37.09	9.847	14	28	23.4	60.96	3 11.0	2	11	35	21.18	6.654	0	52	49.2	65.39	2 52.4				
3	9	55	32.35	9.758	14	3	53.1	61.58	3 10.9	3	11	37	59.21	6.516	0	26	47.3	64.87	2 51.1				
4	9	59	25.47	9.669	13	39	8.4	62.16	3 10.9	4	11	40	33.88	6.374	+0	0	56.0	64.41	2 49.7				
5	10	3	16.44	9.579	13	14	10.0	62.71	3 10.8	5	11	43	5.09	6.228	-0	24	43.8	63.91	2 48.4				
6	10	7	5.26	9.489	12	48	58.6	63.24	3 10.6	6	11	45	32.75	6.078	0	50	11.1	63.37	2 46.9				
7	10	10	51.91	9.398	12	23	34.9	63.74	3 10.4	7	11	47	56.75	5.923	1	15	24.9	62.79	2 45.3				
8	10	14	36.40	9.306	11	57	59.8	64.30	3 10.2	8	11	50	16.98	5.764	1	40	24.1	62.16	2 43.7				
9	10	18	18.70	9.217	11	32	13.9	64.64	3 10.0	9	11	52	33.33	5.600	2	5	7.7	61.48	2 42.0				
10	10	21	58.82	9.126	11	6	17.9	65.04	3 9.8	10	11	54	45.67	5.430	2	29	34.5	60.76	2 40.2				
11	10	25	36.75	9.035	10	40	12.6	65.41	3 9.5	11	11	56	53.86	5.255	2	53	43.3	59.98	2 38.4				
12	10	29	12.47	8.943	10	13	58.6	65.75	3 9.2	12	11	58	57.78	5.073	3	17	32.9	59.15	2 36.6				
13	10	32	45.95	8.850	9	47	36.6	66.07	3 8.8	13	12	0	57.27	4.885	3	41	2.0	58.27	2 34.6				
14	10	36	17.20	8.756	9	21	7.6	66.35	3 8.4	14	12	2	52.18	4.691	4	4	9.3	57.33	2 32.5				
15	10	39	46.21	8.661	8	54	32.2	66.60	3 7.9	15	12	4	42.35	4.490	4	26	53.4	56.33	2 30.4				
16	10	43	12.94	8.566	8	27	51.1	66.83	3 7.4	16	12	6	27.60	4.288	4	49	12.9	55.28	2 27.2				
17	10	46	37.37	8.469	8	1	5.0	67.02	3 6.8	17	12	8	7.76	4.085	5	11	6.1	54.16	2 26.0				
18	10	49	59.46	8.371	7	34	14.8	67.17	3 6.2	18	12	9	42.64	3.841	5	32	31.4	52.96	2 23.6				
19	10	53	19.19	8.272	7	7	21.2	67.39	3 5.6	19	12	11	12.03	3.609	5	53	27.1	51.69	2 21.1				
20	10	56	36.53	8.172	6	40	25.2	67.38	3 5.0	20	12	12	35.75	3.368	6	13	51.5	50.34	2 18.6				
21	10	59	51.44	8.071	6	13	27.6	67.44	3 4.3	21	12	13	53.59	3.119	6	33	42.5	48.91	2 15.9				
22	11	3	3.87	7.967	5	46	29.0	67.46	3 3.5	22	12	15	5.33	2.861	6	52	58.1	47.40	2 13.1				
23	11	6	13.78	7.860	5	19	30.3	67.44	3 2.7	23	12	16	10.76	2.593	7	11	36.3	45.80	2 10.3				
24	11	9	21.11	7.751	4	52	32.4	67.39	3 1.9	24	12	17	9.66	2.316	7	29	35.0	44.11	2 7.4				
25	11	12	25.81	7.640	4	25	36.0	67.31	3 1.0	25	12	18	1.82	2.030	7	46	51.8	42.32	2 4.3				
26	11	15	27.83	7.527	3	58	42.1	67.18	3 0.1	26	12	18	47.02	1.736	8	3	24.5	40.43	2 1.1				
27	11	18	27.10	7.412	3	31	51.7	67.02	2 59.1	27	12	19	25.06	1.434	8	19	10.8	38.44	1 57.8				
28	11	21	23.56	7.293	3	5	5.5	66.83	2 58.1	28	12	19	55.73	1.123	8	34	8.2	36.34	1 54.5				
29	11	24	17.14	7.172	2	38	24.4	66.60	2 57.1	29	12	20	18.84	0.804	8	48	14.1	34.14	1 50.9				
30	11	27	7.77	7.048	2	11	49.3	66.33	2 56.0	30	12	20	34.23	0.478	9	1	25.8	31.84	1 47.2				
31	11	29	55.38	6.920	1	45	21.1	66.02	2 54.8	31	12	20	41.72	+0.145	9	13	40.7	29.49	1 43.3				
32	11	32	39.87	+6.789	+1	19	0.8	-65.67	2 53.6	32	12	20	41.18	-0.193	-9	24	56.1	-66.68	1 39.3				
Day of the Month. 5th.						10th.	15th.	20th.	25th.	30th.	Day of the Month. 4th.						9th.	14th.	19th.	24th.	29th.		
Semidiameter						10.9	11.5	12.2	12.9	13.7	14.7	Semidiameter						15.7	16.9	18.3	19.7	21.4	23.2
Hor. Parallax						11.3	11.9	12.6	13.4	14.2	15.2	Hor. Parallax						16.3	17.5	18.9	20.4	22.1	24.0

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.



## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m		
1	12 20 41.18	-0.193	9 24 56.1	-26.88	1 39.3	1	11 34 9.56	-4.076	5 34 21.8	+52.70	22 49.7		
2	12 20 32.49	0.534	9 35 9.4	24.22	1 35.3	2	11 32 35.39	3.776	5 13 19.8	52.47	22 44.3		
3	12 20 15.56	0.879	9 44 17.9	21.46	1 31.0	3	11 31 8.62	3.456	4 52 26.8	51.95	22 39.1		
4	12 19 50.34	1.224	9 52 18.8	18.59	1 26.7	4	11 29 49.72	3.119	4 31 49.6	51.16	22 34.0		
5	12 19 16.82	1.570	9 59 9.1	15.61	1 22.3	5	11 28 39.08	2.768	4 11 34.4	50.12	22 28.9		
6	12 18 35.00	1.915	10 4 46.3	12.52	1 17.6	6	11 27 37.03	2.405	3 51 47.0	48.84	22 24.1		
7	12 17 44.92	2.257	10 9 8.3	9.32	1 12.8	7	11 26 43.79	2.033	3 32 32.6	47.36	22 19.4		
8	12 16 46.72	2.594	10 12 12.7	6.03	1 8.0	8	11 25 59.55	1.655	3 13 56.1	45.70	22 14.8		
9	12 15 40.52	2.924	10 13 57.1	-2.66	1 3.0	9	11 25 24.40	1.274	2 56 1.5	43.87	22 10.4		
10	12 14 26.51	3.243	10 14 19.7	+0.78	0 57.9	10	11 24 58.41	0.891	2 38 52.5	41.89	22 6.2		
11	12 13 4.98	3.549	10 13 18.9	4.29	0 52.6	11	11 24 41.61	0.508	2 22 32.5	39.78	22 2.1		
12	12 11 36.25	3.843	10 10 53.2	7.85	0 47.1	12	11 24 33.97	-0.192	2 7 4.3	37.57	21 58.2		
13	12 10 0.71	4.119	10 7 2.0	11.43	0 51.5	13	11 24 35.41	+0.948	1 52 30.1	35.28	21 54.5		
14	12 8 18.77	4.376	10 1 44.8	15.02	0 36.0	14	11 24 45.80	0.618	1 38 51.5	32.22	21 50.8		
15	12 6 30.95	4.612	9 55 1.8	18.59	0 30.3	15	11 25 5.01	0.922	1 26 10.0	30.52	21 47.4		
16	12 4 37.77	4.829	9 46 53.5	22.12	0 24.4	16	11 25 32.88	1.339	1 14 26.7	28.08	21 44.1		
17	12 2 39.86	5.005	9 37 21.3	25.58	0 18.5	17	11 26 9.22	1.688	1 3 42.4	25.61	21 40.8		
18	12 0 37.91	5.159	9 26 27.0	28.25	0 12.5	18	11 26 53.84	2.029	0 53 57.0	23.13	21 37.7		
19	11 58 32.65	5.282	9 14 13.2	29.21	0 6.4	19	11 27 46.53	2.361	0 45 12.4	20.64	21 34.8		
20	11 56 24.84	5.371	9 0 43.3	35.31	0 0.3 23 54.2	20	11 28 47.06	2.684	0 37 26.9	18.15	21 32.0		
21	11 54 15.28	5.426	8 46 1.2	38.23	23 48.2	21	11 29 55.21	2.997	0 30 40.9	15.67	21 29.3		
22	11 52 4.81	5.447	8 30 11.4	40.94	23 42.2	22	11 31 10.75	3.300	0 24 54.2	12.22	21 26.6		
23	11 49 54.27	5.432	8 13 19.2	43.41	23 36.2	23	11 32 33.45	3.563	0 20 6.2	10.79	21 24.2		
24	11 47 44.55	5.380	7 55 30.7	45.63	23 30.2	24	11 34 3.07	3.877	0 16 16.2	8.38	21 21.8		
25	11 45 36.52	5.291	7 36 52.5	47.56	23 24.2	25	11 35 39.39	4.151	0 13 23.6	6.00	21 19.6		
26	11 43 31.04	5.168	7 17 31.5	49.19	23 18.2	26	11 37 22.18	4.416	0 11 27.5	3.67	21 17.5		
27	11 41 28.93	5.010	6 57 34.8	50.53	23 12.3	27	11 39 11.21	4.671	0 10 27.0	+1.37	21 15.5		
28	11 39 30.99	4.820	6 37 9.9	51.55	23 6.5	28	11 41 6.25	4.917	0 10 21.3	-0.89	21 13.6		
29	11 37 37.99	4.599	6 16 24.3	52.25	23 0.7	29	11 43 7.08	5.154	0 11 9.2	3.10	21 11.7		
30	11 35 50.62	4.350	5 55 25.7	52.63	22 55.1	30	11 45 13.49	5.382	0 12 49.5	5.27	21 10.0		
31	11 34 9.56	4.076	5 34 21.8	52.70	22 49.7	31	11 47 25.27	5.601	0 15 21.1	7.38	21 8.3		
32	11 32 35.39	-3.776	5 13 19.8	+52.47	22 44.3	32	11 49 42.22	+5.819	-0 18 42.8	-9.44	21 6.7		
Day of the Month.						Day of the Month.							
3d.		8th.	13th.	18th.	23d.	28th.	3d.		8th.	13th.	18th.	23d.	28th.
Semidiameter		25.1	26.9	28.6	29.8	30.4	Semidiameter		29.4	27.9	26.2	24.3	22.5
Hor. Parallax		26.0	27.9	29.6	30.9	31.5	Hor. Parallax		30.4	28.9	27.1	25.2	23.4

NOTE.—North declinations are marked +, south declinations —.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>			
1	11 49 42.22	+5.812	0 18 42.8	-9.44	21 6.7	1	13 25 21.62	+9.407	-6 40 26.0	-46.58	20 45.3			
2	11 52 4.15	6.014	0 22 53.4	11.44	21 5.1	2	13 29 10.49	9.573	6 59 10.1	47.07	20 45.2			
3	11 54 30.82	6.209	0 27 51.5	13.40	21 3.7	3	13 33 1.18	9.648	7 18 5.4	47.59	20 45.2			
4	11 57 2.08	6.396	0 33 35.8	15.30	21 2.3	4	13 36 53.65	9.722	7 37 11.1	47.92	20 45.1			
5	11 59 37.74	6.576	0 40 5.2	17.14	21 1.0	5	13 40 47.88	9.795	7 56 25.9	48.28	20 45.1			
6	12 2 17.62	6.749	0 47 18.1	18.92	20 59.9	6	13 44 43.83	9.867	8 15 48.7	48.60	20 45.2			
7	12 5 1.55	6.914	0 55 13.1	20.85	20 58.8	7	13 48 41.50	9.937	8 35 18.5	48.88	20 45.2			
8	12 7 49.36	7.072	1 3 48.9	22.33	20 57.7	8	13 52 40.85	10.007	8 54 54.3	49.11	20 45.3			
9	12 10 40.88	7.223	1 13 4.2	23.95	20 56.7	9	13 56 41.86	10.076	9 14 35.2	49.29	20 45.4			
10	12 13 35.98	7.368	1 22 57.7	25.51	20 55.7	10	14 0 44.52	10.144	9 34 19.9	49.43	20 45.5			
11	12 16 34.50	7.507	1 33 27.8	27.01	20 54.8	11	14 4 48.79	10.212	9 54 7.5	49.53	20 45.6			
12	12 19 36.29	7.640	1 44 33.4	28.45	20 53.9	12	14 8 54.67	10.278	10 13 57.0	49.59	20 45.8			
13	12 22 41.21	7.768	1 56 13.0	29.85	20 53.1	13	14 13 2.13	10.344	10 33 47.3	49.61	20 46.0			
14	12 25 49.15	7.892	2 8 25.4	31.19	20 52.3	14	14 17 11.17	10.409	10 53 37.5	49.58	20 46.2			
15	12 29 0.01	8.011	2 21 9.4	32.48	20 51.6	15	14 21 21.77	10.474	11 13 26.5	49.51	20 46.4			
16	12 32 13.68	8.127	2 34 23.7	33.72	20 50.9	16	14 25 33.91	10.538	11 33 13.3	49.40	20 46.7			
17	12 35 30.05	8.238	2 48 7.0	34.90	20 50.2	17	14 29 47.58	10.602	11 52 57.1	49.25	20 47.0			
18	12 38 49.04	8.345	3 2 18.2	36.04	20 49.6	18	14 34 2.78	10.665	12 12 36.9	49.06	20 47.4			
19	12 42 10.56	8.448	3 16 56.1	37.13	20 49.1	19	14 38 19.51	10.729	12 32 11.7	48.83	20 47.7			
20	12 45 34.51	8.548	3 31 59.5	38.17	20 48.6	20	14 42 37.77	10.792	12 51 40.5	48.57	20 48.1			
21	12 49 0.82	8.645	3 47 27.3	39.16	20 48.1	21	14 46 57.55	10.856	13 11 2.4	48.37	20 48.5			
22	12 52 29.43	8.739	4 3 18.5	40.11	20 47.7	22	14 51 18.84	10.919	13 30 16.6	47.92	20 48.9			
23	12 56 0.28	8.831	4 19 31.9	41.01	20 47.3	23	14 55 41.65	10.982	13 49 22.1	47.56	20 49.4			
24	12 59 33.31	8.921	4 36 6.3	41.87	20 47.0	24	15 0 5.98	11.046	14 8 18.2	47.13	20 49.9			
25	13 3 8.47	9.009	4 53 0.7	42.68	20 46.7	25	15 4 31.83	11.109	14 27 3.8	46.67	20 50.4			
26	13 6 45.71	9.094	5 10 14.1	43.44	20 46.4	26	15 8 59.18	11.172	14 45 38.0	46.18	20 51.0			
27	13 10 24.98	9.178	5 27 45.2	44.15	20 46.1	27	15 13 28.05	11.235	15 3 59.8	45.65	20 51.6			
28	13 14 6.25	9.261	5 45 33.0	44.82	20 45.8	28	15 17 58.43	11.297	15 22 8.4	45.08	20 52.2			
29	13 17 49.47	9.341	6 3 36.4	45.45	20 45.6	29	15 22 30.31	11.360	15 40 2.8	45.47	20 52.8			
30	13 21 34.60	9.420	6 21 54.5	46.04	20 45.4	30	15 27 3.69	11.422	15 57 42.2	45.83	20 53.4			
31	13 25 21.62	9.497	6 40 26.0	46.58	20 45.3	31	15 31 38.57	11.484	16 15 5.7	45.15	20 54.0			
32	13 29 10.49	+9.573	-6 59 10.1	-47.07	20 45.2	32	15 36 14.93	+11.546	-16 32 12.4	+42.43	20 54.7			
Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
Semidiameter	19.2	17.9	16.6	15.5	14.5	13.7	Semidiameter	12.9	12.2	11.6	11.0	10.5	10.1	9.6
Hor. Parallax	20.0	18.5	17.2	16.1	15.1	14.2	Hor. Parallax	13.4	12.6	12.0	11.4	10.9	10.4	10.0

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	16 14 53.83	+7.316	21 9 45.2	-19.98	21 30.9	1	17 48 42.92	+7.759	23 42 21.4	-4.04	21 2.7
2	16 17 49.64	7.334	21 17 39.3	19.53	21 29.9	2	17 51 49.26	7.768	23 43 51.7	3.48	21 1.9
3	16 20 45.88	7.352	21 25 22.5	19.07	21 28.9	3	17 54 55.79	7.776	23 45 8.4	2.92	21 1.0
4	16 23 42.56	7.371	21 32 54.7	18.60	21 27.9	4	17 58 2.49	7.783	23 46 11.5	2.35	21 0.2
5	16 26 39.68	7.389	21 40 15.7	18.14	21 26.9	5	18 1 9.37	7.790	23 47 1.1	1.78	20 59.4
6	16 29 37.23	7.406	21 47 25.4	17.67	21 25.9	6	18 4 16.42	7.797	23 47 37.0	1.21	20 58.5
7	16 32 35.21	7.424	21 54 23.8	17.19	21 25.0	7	18 7 23.62	7.803	23 47 59.2	0.64	20 57.7
8	16 35 33.60	7.441	22 1 10.7	16.71	21 24.0	8	18 10 30.97	7.809	23 48 7.7	-0.07	20 56.9
9	16 38 32.41	7.458	22 7 46.1	16.22	21 23.1	9	18 13 38.46	7.814	23 48 2.4	+0.50	20 56.1
10	16 41 31.64	7.476	22 14 9.8	15.73	21 22.1	10	18 16 46.08	7.819	23 47 43.4	1.08	20 55.3
11	16 44 31.27	7.493	22 20 21.6	15.24	21 21.2	11	18 19 53.82	7.824	23 47 10.5	1.68	20 54.5
12	16 47 31.30	7.509	22 26 21.7	14.74	21 20.2	12	18 23 1.66	7.828	23 46 23.8	2.24	20 53.7
13	16 50 31.73	7.525	22 32 9.7	14.24	21 19.3	13	18 26 9.59	7.831	23 45 23.3	2.81	20 52.9
14	16 53 32.55	7.542	22 37 45.6	13.74	21 18.4	14	18 29 17.59	7.834	23 44 9.0	3.38	20 52.0
15	16 56 33.76	7.558	22 43 9.3	13.23	21 17.5	15	18 32 25.65	7.837	23 42 40.9	3.96	20 51.2
16	16 59 35.34	7.573	22 48 20.7	12.72	21 16.6	16	18 35 33.76	7.838	23 40 59.0	4.54	20 50.4
17	17 2 37.28	7.588	22 53 19.7	12.20	21 15.7	17	18 38 41.90	7.839	23 39 3.3	5.11	20 49.6
18	17 5 39.57	7.603	22 58 6.2	11.68	21 14.8	18	18 41 50.06	7.840	23 36 53.8	5.68	20 48.8
19	17 8 42.21	7.617	23 2 40.1	11.16	21 13.9	19	18 44 58.23	7.840	23 34 30.4	6.26	20 48.0
20	17 11 45.18	7.630	23 7 1.4	10.62	21 13.0	20	18 48 6.40	7.839	23 31 53.2	6.83	20 47.2
21	17 14 48.48	7.644	23 11 9.9	10.08	21 13.1	21	18 51 14.55	7.838	23 29 2.3	7.41	20 46.4
22	17 17 52.09	7.656	23 15 5.5	9.54	21 11.2	22	18 54 22.66	7.836	23 25 57.8	7.98	20 45.6
23	17 20 56.00	7.669	23 18 48.2	9.00	21 10.4	23	18 57 30.73	7.834	23 22 39.6	8.54	20 44.8
24	17 24 0.20	7.681	23 22 18.0	8.46	21 9.5	24	19 0 38.73	7.832	23 19 7.7	9.11	20 44.0
25	17 27 4.68	7.692	23 25 34.7	7.92	21 8.6	25	19 3 46.66	7.828	23 15 22.3	9.67	20 43.2
26	17 30 9.42	7.703	23 28 38.3	7.38	21 7.8	26	19 6 54.51	7.825	23 11 23.3	10.24	20 42.4
27	17 33 14.42	7.713	23 31 28.8	6.83	21 6.9	27	19 10 2.27	7.821	23 7 10.8	10.80	20 41.5
28	17 36 19.66	7.723	23 34 5.9	6.27	21 6.1	28	19 13 9.93	7.817	23 2 44.8	11.36	20 40.7
29	17 39 25.14	7.733	23 36 29.8	5.72	21 5.2	29	19 16 17.48	7.812	22 58 5.4	11.91	20 39.9
30	17 42 30.85	7.742	23 38 40.3	5.16	21 4.4	30	19 19 24.92	7.807	22 53 12.7	12.47	20 39.1
31	17 45 36.78	7.751	23 40 37.6	4.60	21 3.5	31	19 22 32.22	7.801	22 48 6.6	13.02	20 38.3
32	17 48 42.92	+7.759	23 42 21.4	-4.04	21 2.7	32	19 25 39.38	+7.795	22 42 47.3	+13.57	20 37.4
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th.						0. 5th. 10th. 15th. 20th. 25th.					
Semidiameter 2.24 2.27 2.31 2.34 2.38 2.42						Semidiameter 2.46 2.50 2.55 2.59 2.64 2.69					
Hor. Parallax 3.92 3.98 4.04 4.10 4.17 4.24						Hor. Parallax 4.31 4.38 4.46 4.54 4.63 4.72					

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

MARCH.						APRIL.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.		
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.				
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	m h			
1	19 16 17.48	+7.812	22 58 5.4	+11.91	20 39.9	1	20 51 32.32	+7.498	18 49 29.3	+37.48	20 12.8		
2	19 19 24.92	7.807	22 53 12.7	12.47	20 39.1	2	20 54 32.11	7.484	18 38 24.7	37.91	20 11.9		
3	19 22 32.22	7.801	22 48 6.6	13.02	20 38.3	3	20 57 31.56	7.469	18 27 9.9	38.33	20 10.9		
4	19 25 39.38	7.795	22 42 47.3	13.57	20 37.4	4	21 0 30.67	7.455	18 15 45.2	38.75	20 10.0		
5	19 28 46.41	7.789	22 37 14.8	14.13	20 36.6	5	21 3 29.43	7.441	18 4 10.6	39.16	20 9.0		
6	19 31 53.28	7.783	22 31 29.1	14.67	20 35.8	6	21 6 27.86	7.427	17 52 26.2	39.55	20 8.0		
7	19 35 0.00	7.777	22 25 30.3	15.22	20 35.0	7	21 9 25.95	7.413	17 40 32.3	39.95	20 7.1		
8	19 38 6.56	7.770	22 19 18.5	15.76	20 34.1	8	21 12 23.70	7.399	17 28 28.9	30.34	20 6.1		
9	19 41 12.96	7.763	22 12 53.6	16.30	20 33.3	9	21 15 21.10	7.384	17 16 16.2	30.73	20 5.1		
10	19 44 19.17	7.755	22 6 15.8	16.83	20 32.4	10	21 18 18.16	7.370	17 3 54.3	31.10	20 4.1		
11	19 47 25.19	7.747	21 59 25.3	17.36	20 31.6	11	21 21 14.87	7.356	16 51 23.4	31.47	20 3.1		
12	19 50 31.01	7.738	21 52 22.1	17.89	20 30.7	12	21 24 11.24	7.341	16 38 43.7	31.83	20 2.1		
13	19 53 36.62	7.730	21 45 6.2	18.42	20 29.9	13	21 27 7.25	7.326	16 25 55.2	32.18	20 1.0		
14	19 56 42.02	7.720	21 37 37.7	18.94	20 29.0	14	21 30 2.91	7.312	16 12 58.3	32.54	20 0.0		
15	19 59 47.19	7.710	21 29 56.8	19.46	20 28.2	15	21 32 58.20	7.297	15 59 53.1	32.89	19 59.0		
16	20 2 52.13	7.700	21 22 3.6	19.97	20 27.3	16	21 35 53.13	7.281	15 46 39.7	33.22	19 58.0		
17	20 5 56.83	7.690	21 13 58.1	20.48	20 26.4	17	21 38 47.70	7.265	15 33 18.3	33.55	19 57.0		
18	20 9 1.27	7.680	21 5 40.4	20.98	20 25.6	18	21 41 41.90	7.250	15 19 49.1	33.87	19 55.9		
19	20 12 5.45	7.669	20 57 10.7	21.48	20 24.7	19	21 44 35.74	7.235	15 6 12.3	34.19	19 54.8		
20	20 15 9.36	7.658	20 48 29.1	21.98	20 23.8	20	21 47 29.21	7.219	14 52 28.1	34.49	19 53.8		
21	20 18 12.98	7.646	20 39 35.8	22.47	20 22.9	21	21 50 22.30	7.203	14 38 36.7	34.79	19 52.7		
22	20 21 16.31	7.633	20 30 30.8	22.95	20 22.0	22	21 53 15.02	7.188	14 24 38.2	35.08	19 51.6		
23	20 24 19.35	7.620	20 21 14.3	23.42	20 21.1	23	21 56 7.36	7.173	14 10 32.8	35.37	19 50.6		
24	20 27 22.09	7.607	20 11 46.4	23.89	20 20.2	24	21 58 59.32	7.157	13 56 20.6	35.64	19 49.5		
25	20 30 24.51	7.594	20 2 7.3	24.35	20 19.3	25	22 1 50.91	7.141	13 42 1.9	35.91	19 48.4		
26	20 33 26.61	7.580	19 52 17.1	24.82	20 18.4	26	22 4 42.13	7.126	13 27 36.8	36.17	19 47.3		
27	20 36 28.39	7.567	19 42 15.9	25.27	20 17.5	27	22 7 32.98	7.111	13 13 5.4	36.43	19 46.2		
28	20 39 29.84	7.554	19 32 3.9	25.72	20 16.6	28	22 10 23.46	7.095	12 58 28.0	36.69	19 45.1		
29	20 42 30.96	7.540	19 21 41.1	26.16	20 15.6	29	22 13 13.58	7.080	12 43 44.7	36.92	19 44.0		
30	20 45 31.75	7.526	19 11 7.6	26.61	20 14.7	30	22 16 3.34	7.065	12 28 55.6	37.16	19 42.9		
31	20 48 32.20	7.511	19 0 23.6	27.05	20 13.8	31	22 18 52.74	7.051	12 14 0.8	37.39	19 41.8		
32	20 51 32.32	+7.498	18 49 29.3	+37.48	20 12.8	32	22 21 41.78	+7.037	11 59 0.6	+37.62	19 40.7		
Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter	2.75	2.80	2.86	2.92	2.98	3.04	Semidiameter	3.10	3.17	3.24	3.31	3.39	3.47
Hor. Parallax	4.81	4.90	5.00	5.10	5.21	5.27	Hor. Parallax	5.44	5.56	5.68	5.80	5.93	6.06

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.			
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.					
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m				
1	22 18 52.74	+7.051	12 14 0.8	+37.39	19 41.8	1	23 43 41.18	+6.637	4 1 10.0	+40.87	19 4.3			
2	22 21 41.78	7.037	11 59 0.6	37.62	19 40.7	2	23 46 20.32	6.625	3 44 48.8	40.87	19 3.0			
3	22 24 30.48	7.023	11 43 55.1	37.84	19 39.5	3	23 48 59.17	6.613	3 28 27.7	40.86	19 1.7			
4	22 27 18.85	7.008	11 28 44.4	38.06	19 38.4	4	23 51 37.75	6.602	3 12 6.9	40.86	19 0.4			
5	22 30 6.89	6.994	11 13 28.7	38.28	19 37.2	5	23 54 16.05	6.590	2 55 46.6	40.85	18 59.1			
6	22 32 54.59	6.980	10 58 8.2	38.45	19 36.1	6	23 56 54.07	6.579	2 39 26.9	40.79	18 57.8			
7	22 35 41.96	6.966	10 42 43.1	38.64	19 34.9	7	23 59 31.81	6.568	2 23 8.1	40.76	18 56.5			
8	22 38 29.00	6.952	10 27 13.4	38.82	19 33.8	8	0 2 9.28	6.556	2 6 50.3	40.71	18 55.1			
9	22 41 15.71	6.939	10 11 39.5	39.00	19 32.6	9	0 4 46.48	6.545	1 50 33.7	40.66	18 53.8			
10	22 44 2.10	6.926	9 56 1.5	39.17	19 31.4	10	0 7 23.41	6.533	1 34 18.4	40.60	18 52.5			
11	22 46 48.15	6.912	9 40 19.6	39.33	19 30.2	11	0 10 0.06	6.521	1 18 4.6	40.53	18 51.2			
12	22 49 33.88	6.899	9 24 33.8	39.48	19 29.1	12	0 12 36.43	6.509	1 1 52.6	40.46	18 49.8			
13	22 52 19.29	6.885	9 8 44.4	39.63	19 27.9	13	0 15 12.51	6.497	0 45 42.6	40.38	18 48.5			
14	22 55 4.39	6.872	8 52 51.7	39.76	19 26.7	14	0 17 48.30	6.485	0 9 34.7	40.28	18 47.1			
15	22 57 49.15	6.859	8 36 55.9	39.88	19 25.5	15	0 20 23.79	6.473	0 13 29.1	40.18	18 45.7			
16	23 0 33.60	6.845	8 20 57.2	40.00	19 24.3	16	0 22 58.99	6.460	+0 2 34.0	40.07	18 44.4			
17	23 3 17.72	6.831	8 4 55.8	40.11	19 23.1	17	0 25 33.88	6.447	0 18 34.3	39.96	18 43.0			
18	23 6 1.52	6.818	7 48 51.9	40.21	19 21.8	18	0 28 8.46	6.435	0 34 31.8	39.83	18 41.7			
19	23 8 44.99	6.805	7 32 45.6	40.31	19 20.6	19	0 30 42.74	6.423	0 50 26.2	39.70	18 40.3			
20	23 11 28.14	6.791	7 16 37.1	40.39	19 19.4	20	0 33 16.71	6.409	1 6 17.4	39.56	18 38.9			
21	23 14 10.96	6.778	7 0 36.7	40.47	19 18.1	21	0 35 50.36	6.395	1 22 5.3	39.42	18 37.5			
22	23 16 53.46	6.764	6 44 14.6	40.54	19 16.9	22	0 38 23.69	6.382	1 37 49.7	39.28	18 36.1			
23	23 19 35.63	6.751	6 28 0.8	40.60	19 15.7	23	0 40 56.70	6.368	1 53 30.5	39.12	18 34.7			
24	23 22 17.49	6.737	6 11 45.4	40.66	19 14.4	24	0 43 29.38	6.354	2 9 7.5	38.96	18 33.3			
25	23 24 59.03	6.724	5 55 28.8	40.71	19 13.2	25	0 46 1.73	6.341	2 24 40.5	38.79	18 31.9			
26	23 27 40.25	6.711	5 39 11.1	40.75	19 11.9	26	0 48 33.75	6.327	2 40 9.5	38.62	18 30.5			
27	23 30 21.16	6.698	5 22 52.3	40.79	19 10.6	27	0 51 5.44	6.314	2 55 34.3	38.44	18 29.1			
28	23 33 1.76	6.685	5 6 32.8	40.80	19 9.4	28	0 53 36.81	6.301	3 10 54.8	38.26	18 27.7			
29	23 35 42.05	6.673	4 50 12.7	40.85	19 8.1	29	0 56 7.86	6.287	3 26 10.9	38.08	18 26.2			
30	23 38 22.05	6.661	4 33 52.0	40.86	19 6.8	30	0 58 38.57	6.273	3 41 32.5	37.88	18 24.8			
31	23 41 1.76	6.649	4 17 31.1	40.87	19 5.5	31	1 1 8.96	6.259	3 56 29.4	37.68	18 23.4			
32	23 43 41.18	+6.637	4 1 10.0	+40.87	19 4.3	32	1 3 39.01	+6.245	+4 11 31.4	+37.48	18 21.9			
Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
Semidiameter	3.55	3.63	3.71	3.80	3.89	3.99	4.08	Semidiameter	4.18	4.29	4.40	4.52	4.64	4.77
Hor. Parallax	6.20	6.35	6.50	6.66	6.82	6.99	7.16	Hor. Parallax	7.34	7.52	7.72	7.92	8.13	8.35

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	1 1 8.96	+6.250	3 56 29.4	+37.68	18 23.4	1	2 15 15.18	+5.603	10 53 47.9	+26.87	17 35.1
2	1 3 39.01	6.245	4 11 31.4	37.48	18 21.9	2	2 17 29.32	5.579	11 5 16.7	26.52	17 33.4
3	1 6 8.72	6.231	4 26 28.5	37.37	18 20.5	3	2 19 42.70	5.541	11 16 37.2	26.16	17 31.7
4	1 8 38.09	6.216	4 41 20.5	37.06	18 19.0	4	2 21 55.31	5.509	11 27 49.3	27.62	17 29.9
5	1 11 7.11	6.201	4 56 7.3	36.84	18 17.5	5	2 24 7.12	5.474	11 38 53.0	27.47	17 28.1
6	1 13 35.77	6.187	5 10 48.7	36.61	18 16.1	6	2 26 18.11	5.439	11 49 48.1	27.11	17 26.4
7	1 16 4.07	6.171	5 25 24.5	36.38	18 14.6	7	2 28 28.24	5.403	12 0 34.6	26.75	17 24.6
8	1 18 32.00	6.155	5 39 54.6	36.13	18 13.1	8	2 30 37.49	5.366	12 11 12.4	26.38	17 22.8
9	1 20 59.55	6.139	5 54 19.0	35.89	18 11.6	9	2 32 45.83	5.327	12 21 41.4	26.02	17 21.0
10	1 23 26.70	6.122	6 8 37.4	35.64	18 10.1	10	2 34 53.22	5.287	12 32 1.5	25.66	17 19.2
11	1 25 53.44	6.105	6 22 49.6	35.37	18 8.7	11	2 36 59.64	5.246	12 42 12.7	25.36	17 17.3
12	1 28 19.77	6.087	6 36 55.6	35.11	18 7.1	12	2 39 5.04	5.202	12 52 14.0	24.90	17 15.4
13	1 30 45.66	6.069	6 50 55.2	34.84	18 5.6	13	2 41 9.39	5.157	13 2 8.0	24.52	17 13.6
14	1 33 11.09	6.050	7 4 48.0	34.57	18 4.1	14	2 43 12.65	5.111	13 11 52.2	24.15	17 11.7
15	1 35 36.06	6.030	7 18 34.0	34.28	18 2.6	15	2 45 14.78	5.064	13 21 27.3	23.77	17 9.8
16	1 38 0.55	6.009	7 32 13.2	33.99	18 1.0	16	2 47 15.76	5.015	13 30 53.2	23.39	17 7.8
17	1 40 24.54	5.988	7 45 45.5	33.69	17 59.5	17	2 49 15.55	4.965	13 40 10.0	23.01	17 5.9
18	1 42 48.02	5.967	7 59 10.6	33.39	17 58.0	18	2 51 14.12	4.914	13 49 17.7	22.63	17 3.9
19	1 45 10.97	5.945	8 12 28.5	33.09	17 56.4	19	2 53 11.44	4.862	13 58 16.3	22.25	17 1.9
20	1 47 33.37	5.922	8 25 39.1	32.78	17 54.8	20	2 55 7.47	4.807	14 7 5.7	21.87	16 59.9
21	1 49 55.22	5.899	8 38 42.3	32.47	17 53.2	21	2 57 2.18	4.751	14 15 46.0	21.49	16 57.8
22	1 52 16.51	5.874	8 51 38.0	32.16	17 51.7	22	2 58 55.52	4.693	14 24 17.3	21.11	16 55.8
23	1 54 37.21	5.849	9 4 26.2	31.85	17 50.0	23	3 0 47.47	4.634	14 32 39.5	20.73	16 53.7
24	1 56 57.32	5.824	9 17 6.7	31.53	17 48.4	24	3 2 37.99	4.574	14 40 52.7	20.36	16 51.6
25	1 59 16.82	5.799	9 29 39.4	31.21	17 46.8	25	3 4 27.05	4.513	14 48 56.9	19.99	16 49.4
26	2 1 35.69	5.773	9 42 4.5	30.88	17 45.1	26	3 6 14.61	4.450	14 56 52.1	19.62	16 47.3
27	2 3 53.94	5.746	9 54 21.7	30.55	17 43.5	27	3 8 0.64	4.385	15 4 38.4	19.25	16 45.1
28	2 6 11.54	5.719	10 6 31.0	30.22	17 41.8	28	3 9 45.09	4.319	15 12 15.8	18.87	16 42.8
29	2 8 28.48	5.692	10 18 32.4	29.88	17 40.2	29	3 11 27.93	4.251	15 19 44.2	18.50	16 40.6
30	2 10 44.75	5.663	10 30 25.7	29.54	17 38.5	30	3 13 9.12	4.181	15 27 3.8	18.13	16 38.3
31	2 13 0.32	5.634	10 42 10.9	29.21	17 36.8	31	3 14 48.61	4.109	15 34 14.5	17.76	16 36.0
32	2 15 15.18	+5.603	+10 53 47.9	+26.87	17 35.1	32	3 16 26.37	+4.036	+15 41 16.3	+17.39	16 33.7
Day of the Month. 5th. 10th. 15th. 20th. 25th. 30th.						Day of the Month. 4th. 9th. 14th. 19th. 24th. 29th.					
Semidiameter 4.90 5.04 5.18 5.33 5.49 5.67						Semidiameter 5.85 6.04 6.24 6.46 6.69 6.94					
Hor. Parallax 8.58 8.82 9.08 9.34 9.62 9.92						Hor. Parallax 10.24 10.57 10.92 11.31 11.72 12.15					

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	3 16 26.37	+4.036	+15 41 16.3	+17.39	16 33.7	1	3 47 6.44	+0.722	+18 5 34.6	+6.88	15 5.4
2	3 18 2.33	3.959	15 48 9.2	17.09	16 31.4	2	3 47 22.05	0.577	18 8 15.5	6.53	15 1.7
3	3 19 36.45	3.881	15 54 53.3	16.66	16 29.0	3	3 47 34.14	0.429	18 10 48.2	6.19	14 57.9
4	3 21 8.68	3.801	16 1 28.6	16.29	16 26.6	4	3 47 42.67	0.290	18 13 12.7	5.84	14 54.1
5	3 22 38.95	3.718	16 7 55.2	15.92	16 24.1	5	3 47 47.59	+0.198	18 15 28.9	5.50	14 50.2
6	3 24 7.21	3.634	16 14 12.9	15.56	16 21.6	6	3 47 48.85	-0.094	18 17 36.7	5.15	14 46.3
7	3 25 33.40	3.547	16 20 21.9	15.19	16 19.1	7	3 47 46.43	0.178	18 19 36.1	4.79	14 42.3
8	3 26 57.46	3.456	16 26 22.1	14.82	16 16.6	8	3 47 40.29	0.334	18 21 27.0	4.43	14 38.2
9	3 28 19.33	3.363	16 32 13.5	14.46	16 14.0	9	3 47 30.38	0.492	18 23 9.2	4.07	14 34.0
10	3 29 38.93	3.268	16 37 56.2	14.10	16 11.3	10	3 47 16.69	0.649	18 24 42.7	3.71	14 29.8
11	3 30 56.23	3.171	16 43 30.1	13.73	16 8.6	11	3 46 59.22	0.807	18 26 7.6	3.35	14 25.5
12	3 32 11.13	3.070	16 48 55.4	13.37	16 5.9	12	3 46 37.94	0.966	18 27 23.7	2.99	14 21.2
13	3 33 23.60	2.967	16 54 12.1	13.02	16 3.1	13	3 46 12.85	1.124	18 28 30.9	2.62	14 16.8
14	3 34 33.57	2.861	16 59 20.2	12.67	16 0.3	14	3 45 43.98	1.281	18 29 29.2	2.25	14 12.4
15	3 35 40.99	2.753	17 4 19.8	12.31	15 57.5	15	3 45 11.38	1.436	18 30 18.7	1.88	14 7.9
16	3 36 45.77	2.642	17 9 10.9	11.95	15 54.6	16	3 44 35.05	1.590	18 30 59.2	1.50	14 3.3
17	3 37 47.88	2.530	17 13 53.6	11.60	15 51.6	17	3 43 55.06	1.742	18 31 30.7	1.12	13 58.7
18	3 38 47.25	2.415	17 18 28.0	11.25	15 48.7	18	3 43 11.43	1.892	18 31 53.1	0.74	13 54.0
19	3 39 43.83	2.298	17 22 54.1	10.91	15 45.6	19	3 42 24.25	2.039	18 32 6.5	+0.37	13 49.3
20	3 40 37.56	2.178	17 27 11.9	10.57	15 42.5	20	3 41 33.58	2.181	18 32 10.8	-0.01	13 44.5
21	3 41 28.41	2.057	17 31 21.6	10.23	15 39.4	21	3 40 39.51	2.319	18 32 6.1	0.39	13 39.6
22	3 42 16.31	1.933	17 35 23.1	9.89	15 36.3	22	3 39 42.15	2.455	18 31 52.3	0.76	13 34.7
23	3 43 1.22	1.808	17 39 16.5	9.55	15 33.0	23	3 38 41.57	2.588	18 31 29.5	1.14	13 29.7
24	3 43 43.08	1.680	17 43 1.9	9.22	15 29.8	24	3 37 37.89	2.715	18 30 57.7	1.52	13 24.7
25	3 44 21.85	1.550	17 46 39.3	8.89	15 26.5	25	3 36 31.23	2.836	18 30 16.8	1.88	13 19.7
26	3 44 57.47	1.416	17 50 8.7	8.55	15 23.1	26	3 35 21.70	2.952	18 29 27.1	2.25	13 14.6
27	3 45 29.88	1.281	17 53 30.0	8.21	15 19.7	27	3 34 9.45	3.063	18 28 28.6	2.62	13 9.4
28	3 45 59.04	1.145	17 56 43.3	7.88	15 16.2	28	3 32 54.62	3.168	18 27 21.4	2.99	13 4.2
29	3 46 24.88	1.008	17 59 48.4	7.54	15 12.6	29	3 31 37.35	3.266	18 26 5.7	3.34	12 59.0
30	3 46 47.36	0.865	18 2 45.5	7.21	15 9.0	30	3 30 17.80	3.357	18 24 41.6	3.68	12 53.7
31	3 47 6.44	0.722	18 5 34.6	6.88	15 5.4	31	3 28 56.13	3.442	18 23 9.2	4.02	12 48.4
32	3 47 22.05	+0.577	+18 8 15.5	+6.53	15 1.7	32	3 27 32.49	-3.521	+18 21 28.8	-4.34	12 43.1
Day of the Month.						Day of the Month.					
3d. 8th. 13th. 18th. 23d. 28th.						3d. 8th. 13th. 18th. 23d. 28th.					
Semidiameter 7".20 7".48 7".78 8".09 8".41 8".74						Semidiameter 9".07 9".40 9".71 9".90 10".22 10".39					
Hor. Parallax 12.61 13.10 13.62 14.16 14.73 15.30						Hor. Parallax 15.88 16.45 16.99 17.49 17.89 18.18					

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		
1	3 27 32.49	-3.521	+18 21 28.8	-4.34	12 43.1	1	2 46 58.37	-2.198	+17 11 11.3	-3.44	10 5.1		
2	3 26 7.07	3.592	18 19 40.7	4.86	12 37.7	2	2 46 8.87	1.994	17 9 53.0	3.05	10 0.3		
3	3 24 40.02	3.656	18 17 45.2	4.96	12 32.3	3	2 45 22.59	1.890	17 8 44.6	2.64	9 55.6		
4	3 23 11.55	3.711	18 15 42.5	5.23	12 26.9	4	2 44 39.56	1.794	17 7 46.0	2.22	9 51.0		
5	3 21 41.86	3.757	18 13 33.1	5.52	12 21.5	5	2 43 59.81	1.587	17 6 57.7	1.79	9 46.5		
6	3 20 11.16	3.796	18 11 17.4	5.77	12 16.1	6	2 43 23.37	1.449	17 6 20.0	1.34	9 42.0		
7	3 18 39.66	3.825	18 8 55.9	6.00	12 10.6	7	2 42 50.27	1.310	17 5 53.2	0.88	9 37.5		
8	3 17 7.57	3.845	18 6 29.1	6.21	12 5.1	8	2 42 20.50	1.170	17 5 37.4	-0.42	9 33.1		
9	3 15 35.09	3.857	18 3 57.7	6.39	11 59.7	9	2 41 54.10	1.030	17 5 32.7	+0.05	9 28.8		
10	3 14 2.46	3.857	18 1 22.2	6.56	11 54.2	10	2 41 31.05	0.890	17 5 39.5	0.52	9 24.5		
11	3 12 29.91	3.849	17 58 43.1	6.69	11 48.7	11	2 41 11.38	0.749	17 5 57.8	1.00	9 20.2		
12	3 10 57.67	3.832	17 56 1.3	6.79	11 43.3	12	2 40 55.06	0.610	17 6 27.6	1.49	9 16.0		
13	3 9 25.97	3.805	17 53 17.3	6.86	11 37.8	13	2 40 42.10	0.471	17 7 9.0	1.97	9 11.9		
14	3 7 55.01	3.769	17 50 31.9	6.90	11 32.4	14	2 40 32.46	0.333	17 8 2.2	2.46	9 7.9		
15	3 6 25.02	3.725	17 47 45.7	6.92	11 27.0	15	2 40 26.15	0.198	17 9 6.8	2.94	9 3.0		
16	3 4 56.19	3.673	17 44 59.6	6.90	11 21.6	16	2 40 23.11	-0.059	17 10 23.0	3.42	8 59.9		
17	3 3 28.73	3.612	17 42 14.2	6.86	11 16.3	17	2 40 23.34	+0.076	17 11 50.9	3.90	8 55.9		
18	3 2 2.82	3.542	17 39 30.3	6.78	11 10.9	18	2 40 26.78	0.209	17 13 30.3	4.37	8 52.1		
19	3 0 38.67	3.465	17 36 48.6	6.67	11 5.6	19	2 40 33.41	0.341	17 15 20.9	4.84	8 48.3		
20	2 59 16.47	3.381	17 34 9.8	6.54	11 0.3	20	2 40 43.18	0.471	17 17 22.7	5.31	8 44.6		
21	2 57 56.36	3.290	17 31 34.5	6.38	10 55.1	21	2 40 56.04	0.599	17 19 35.4	5.78	8 40.9		
22	2 56 38.51	3.194	17 29 3.4	6.19	10 49.9	22	2 41 11.96	0.725	17 21 58.9	6.20	8 37.2		
23	2 55 23.05	3.091	17 26 37.3	5.97	10 44.7	23	2 41 30.86	0.848	17 24 33.0	6.64	8 33.6		
24	2 54 10.11	2.984	17 24 16.6	5.73	10 39.6	24	2 41 52.70	0.969	17 27 17.4	7.06	8 30.0		
25	2 52 59.80	2.873	17 22 2.0	5.47	10 34.5	25	2 42 17.42	1.088	17 30 11.9	7.48	8 26.5		
26	2 51 52.22	2.757	17 19 54.1	5.18	10 29.5	26	2 42 44.95	1.204	17 33 16.3	7.89	8 23.1		
27	2 50 47.48	2.637	17 17 53.3	4.87	10 24.5	27	2 43 15.25	1.319	17 36 30.3	8.28	8 19.7		
28	2 49 45.65	2.514	17 16 0.2	4.54	10 19.6	28	2 43 48.27	1.431	17 39 53.6	8.67	8 16.3		
29	2 48 46.82	2.388	17 14 15.2	4.19	10 14.7	29	2 44 23.94	1.541	17 43 26.2	9.05	8 13.0		
30	2 47 51.04	2.259	17 12 38.8	3.83	10 9.9	30	2 45 2.23	1.648	17 47 7.7	9.41	8 9.7		
31	2 46 58.37	2.128	17 11 11.3	3.44	10 5.1	31	2 45 43.07	1.754	17 50 57.8	9.77	8 6.4		
32	2 46 8.87	-1.994	+17 9 53.1	-3.05	10 0.3	32	2 46 26.43	+1.858	+17 54 56.3	+10.11	8 3.2		
Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.
Semidiameter	10.46	10.46	10.35	10.15	9.85	9.51	Semidiameter	9.12	8.70	8.29	7.88	7.46	7.03
Hor. Parallax	18.32	18.32	18.16	17.80	17.30	16.69	Hor. Parallax	16.00	15.25	14.53	13.78	13.03	12.32

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; - indicates that north declinations are decreasing and south declinations increasing.



## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	20 53 0.92	+2.256	18 14 32.8	+ 9.04	2 9.6	1	21 21 55.98	+2.370	16 10 19.1	+10.84	0 36.6
2	20 53 55.14	2.263	18 10 55.0	9.11	2 6.6	2	21 22 52.84	2.370	16 5 58.4	10.88	0 33.6
3	20 54 49.53	2.270	18 7 15.5	9.18	2 3.5	3	21 23 49.70	2.369	16 1 36.8	10.92	0 30.6
4	20 55 44.10	2.277	18 3 34.3	9.25	2 0.5	4	21 24 46.54	2.369	15 57 14.2	10.96	0 27.6
5	20 56 38.83	2.283	17 59 51.5	9.32	1 57.5	5	21 25 43.37	2.368	15 52 50.7	11.00	0 24.6
6	20 57 33.70	2.289	17 56 7.0	9.39	1 54.5	6	21 26 40.18	2.367	15 48 26.3	11.04	0 21.6
7	20 58 28.72	2.295	17 52 20.8	9.46	1 51.4	7	21 27 36.96	2.366	15 44 1.1	11.08	0 18.6
8	20 59 23.89	2.301	17 48 33.0	9.53	1 48.4	8	21 28 33.71	2.365	15 39 35.0	11.11	0 15.6
9	21 0 19.20	2.307	17 44 43.8	9.60	1 45.4	9	21 29 30.43	2.363	15 35 8.0	11.14	0 12.6
10	21 1 14.64	2.313	17 40 53.0	9.66	1 42.4	10	21 30 27.11	2.361	15 30 40.3	11.17	0 9.6
11	21 2 10.20	2.318	17 37 0.6	9.72	1 39.4	11	21 31 23.74	2.359	15 26 11.9	11.20	0 6.6
12	21 3 5.89	2.323	17 33 6.6	9.79	1 36.4	12	21 32 20.33	2.357	15 21 42.7	11.23	0 3.6
13	21 4 1.68	2.328	17 29 11.1	9.85	1 33.4	13	21 33 16.87	2.355	15 17 12.8	11.26	0 0.6
14	21 4 57.59	2.332	17 25 14.1	9.91	1 30.4	14	21 34 13.35	2.352	15 12 42.2	11.29	23 54.6
15	21 5 53.60	2.336	17 21 15.6	9.97	1 27.4	15	21 35 9.77	2.349	15 8 11.0	11.31	23 51.6
16	21 6 49.71	2.340	17 17 15.6	10.03	1 24.4	16	21 36 6.12	2.346	15 3 39.1	11.34	23 48.6
17	21 7 45.91	2.344	17 13 14.2	10.09	1 21.4	17	21 37 2.40	2.343	14 59 6.7	11.36	23 45.6
18	21 8 42.20	2.347	17 9 11.4	10.15	1 18.4	18	21 37 58.59	2.340	14 54 33.8	11.38	23 42.6
19	21 9 38.58	2.350	17 5 7.2	10.21	1 15.4	19	21 38 54.71	2.336	14 50 0.4	11.40	23 39.6
20	21 10 35.03	2.353	17 1 1.7	10.26	1 12.4	20	21 39 50.74	2.333	14 45 26.6	11.42	23 36.6
21	21 11 31.55	2.356	16 56 54.8	10.31	1 9.4	21	21 40 46.67	2.328	14 40 52.3	11.44	23 33.6
22	21 12 28.13	2.358	16 52 46.6	10.37	1 6.5	22	21 41 42.50	2.324	14 36 17.6	11.46	23 30.6
23	21 13 24.77	2.360	16 48 37.2	10.42	1 3.5	23	21 42 38.23	2.320	14 31 42.5	11.47	23 27.6
24	21 14 21.46	2.362	16 44 26.5	10.47	1 0.5	24	21 43 33.85	2.315	14 27 7.2	11.48	23 24.6
25	21 15 18.19	2.364	16 40 14.5	10.52	0 57.5	25	21 44 29.36	2.310	14 22 31.6	11.49	23 21.6
26	21 16 14.96	2.366	16 36 1.3	10.57	0 54.5	26	21 45 24.74	2.305	14 17 55.7	11.50	23 18.6
27	21 17 11.76	2.367	16 31 47.0	10.62	0 51.5	27	21 46 19.99	2.300	14 13 19.6	11.50	23 15.5
28	21 18 8.58	2.368	16 27 31.5	10.67	0 48.5	28	21 47 15.11	2.294	14 8 43.3	11.51	23 12.5
29	21 19 5.42	2.369	16 23 15.0	10.72	0 45.5	29	21 48 10.10	2.288	14 4 7.0	11.51	23 9.5
30	21 20 2.27	2.369	16 18 57.4	10.76	0 42.5	30	21 49 4.95	2.282	13 59 30.6	11.52	23 6.5
31	21 20 59.12	2.369	16 14 38.8	10.80	0 39.5	31	21 49 59.65	2.276	13 54 54.1	11.52	23 3.4
32	21 21 55.98	+2.370	16 10 19.1	+10.84	0 36.6	32	21 50 54.19	+2.270	13 50 17.6	+11.52	23 0.4
Day of the Month.	1st.	11th.	21st.	31st.		Day of the Month.	1st.	11th.	21st.	31st.	
Polar Semidiameter	16.0	15.8	15.7	15.6		Polar Semidiameter	15.6	15.6	15.7	15.7	
Horizontal Parallax	1.5	1.5	1.5	1.5		Horizontal Parallax	1.5	1.5	1.5	1.5	

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	9 <sup>h</sup> 48 <sup>m</sup> 10.10	+2.988	14° 4' 7.0"	+11.51	23 9.5	1	22 15 3 65	+2.018	11 43 28.3	+10.90	21 34.4
2	21 49 4.95	2.989	13 59 30.6	11.52	23 6.5	2	22 15 51.92	2.006	11 39 7.2	10.86	21 31.2
3	21 49 59.65	2.976	13 54 54.1	11.53	23 3.4	3	22 16 39.90	1.994	11 34 47.2	10.81	21 28.1
4	21 50 54.19	2.970	13 50 17.6	11.52	23 0.4	4	22 17 27.59	1.982	11 30 28.4	10.76	21 24.9
5	21 51 48.59	2.964	13 45 41.1	11.52	22 57.4	5	22 18 14.99	1.969	11 26 10.8	10.71	21 21.8
6	21 52 42.84	2.957	13 41 4.7	11.52	22 54.4	6	22 19 2.08	1.956	11 21 54.4	10.66	21 18.6
7	21 53 36.93	2.950	13 36 28.4	11.51	22 51.3	7	22 19 48.87	1.943	11 17 39.3	10.61	21 15.5
8	21 54 30.85	2.943	13 31 52.2	11.51	22 48.3	8	22 20 35.36	1.930	11 13 25.5	10.55	21 12.3
9	21 55 24.59	2.936	13 27 15.9	11.50	22 45.3	9	22 21 21.53	1.917	11 9 13.1	10.49	21 9.2
10	21 56 18.16	2.929	13 22 39.8	11.50	22 42.3	10	22 22 7.39	1.904	11 5 2.1	10.43	21 6.0
11	21 57 11.56	2.922	13 18 3.9	11.49	22 39.2	11	22 22 52.92	1.890	11 0 52.5	10.37	21 2.8
12	21 58 4.78	2.914	13 13 28.3	11.48	22 36.2	12	22 23 38.12	1.876	10 56 44.4	10.30	20 59.6
13	21 58 57.82	2.906	13 8 52.9	11.47	22 33.1	13	22 24 22.99	1.862	10 52 37.9	10.24	20 56.4
14	21 59 50.67	2.198	13 4 17.9	11.46	22 30.1	14	22 25 7.52	1.848	10 48 32.9	10.17	20 53.2
15	22 0 43.33	2.190	12 59 43.2	11.44	22 27.0	15	22 25 51.70	1.834	10 44 29.6	10.10	20 50.0
16	22 1 35.78	2.181	12 55 8.9	11.42	22 24.0	16	22 26 35.54	1.819	10 40 28.0	10.03	20 46.8
17	22 2 28.02	2.172	12 50 35.0	11.40	22 20.9	17	22 27 19.02	1.804	10 36 28.1	9.96	20 43.6
18	22 3 20.05	2.163	12 46 1.6	11.38	22 17.9	18	22 28 2.14	1.789	10 32 30.0	9.89	20 40.3
19	22 4 11.88	2.154	12 41 28.9	11.36	22 14.8	19	22 28 44.89	1.774	10 28 33.8	9.81	20 37.1
20	22 5 3.49	2.145	12 36 56.5	11.34	22 11.7	20	22 29 27.27	1.758	10 24 39.4	9.74	20 33.8
21	22 5 54.87	2.136	12 32 24.8	11.31	22 8.6	21	22 30 9.27	1.742	10 20 46.9	9.65	20 30.6
22	22 6 46.02	2.126	12 27 53.8	11.28	22 5.5	22	22 30 50.89	1.726	10 16 56.4	9.57	20 27.3
23	22 7 36.93	2.116	12 23 23.4	11.25	22 2.4	23	22 31 32.12	1.710	10 13 8.0	9.48	20 24.1
24	22 8 27.59	2.106	12 18 53.8	11.22	21 59.3	24	22 32 12.96	1.693	10 9 21.7	9.39	20 20.8
25	22 9 18.00	2.096	12 14 24.9	11.19	21 56.2	25	22 32 53.39	1.676	10 5 37.4	9.30	20 17.6
26	22 10 8.16	2.085	12 9 56.8	11.15	21 53.1	26	22 33 33.42	1.659	10 1 55.3	9.21	20 14.3
27	22 10 58.07	2.074	12 5 29.6	11.11	21 50.0	27	22 34 13.03	1.642	9 58 15.4	9.12	20 11.0
28	22 11 47.73	2.063	12 1 3.4	11.07	21 46.9	28	22 34 52.22	1.624	9 54 37.8	9.03	20 7.7
29	22 12 37.13	2.052	11 56 38.1	11.03	21 43.7	29	22 35 30.98	1.606	9 51 2.4	8.93	20 4.4
30	22 13 26.25	2.041	11 52 13.8	10.99	21 40.6	30	22 36 9.31	1.588	9 47 29.4	8.83	20 1.1
31	22 14 15.09	2.030	11 47 50.6	10.95	21 37.5	31	22 36 47.21	1.570	9 43 58.7	8.73	19 57.8
32	22 15 3.65	+2.018	11 43 28.3	+10.90	21 34.4	32	22 37 24.66	+1.552	9 40 30.4	+8.63	19 54.5
Day of the Month.						Day of the Month.					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter 15.7						Polar Semidiameter 16.4					
Horizontal Parallax 1.5						Horizontal Parallax 1.5					
15.9						16.7					
1.5						1.6					
16.1						17.1					
1.5						1.6					

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	22 36 47.21	+1.570	-9 43 58.7	+8.73	19 57.8	1	22 52 18.23	+0.894	-8 18 41.0	+4.73	18 11.2
2	22 37 24.66	1.552	9 40 30.4	8.63	19 54.5	2	22 52 39.36	0.808	8 16 49.4	4.57	18 7.6
3	22 38 1.68	1.534	9 37 4.6	8.53	19 51.2	3	22 52 59.87	0.842	8 15 1.6	4.41	18 4.0
4	22 38 38.25	1.515	9 33 41.1	8.43	19 47.9	4	22 53 19.78	0.816	8 13 17.0	4.25	18 0.4
5	22 39 14.37	1.496	9 30 20.3	8.32	19 44.6	5	22 53 39.07	0.790	8 11 37.4	4.09	17 56.8
6	22 39 50.04	1.477	9 27 2.1	8.21	19 41.2	6	22 53 57.72	0.764	8 10 1.1	3.93	17 53.2
7	22 40 25.26	1.458	9 23 46.3	8.10	19 37.8	7	22 54 15.74	0.738	8 8 28.8	3.77	17 49.6
8	22 41 0.02	1.438	9 20 33.2	7.99	19 34.4	8	22 54 33.13	0.711	8 7 0.4	3.60	17 45.9
9	22 41 34.30	1.418	9 17 22.8	7.88	19 31.1	9	22 54 49.87	0.684	8 5 36.0	3.43	17 42.2
10	22 42 8.11	1.398	9 14 15.2	7.76	19 27.7	10	22 55 5.96	0.657	8 4 15.8	3.26	17 38.5
11	22 42 41.42	1.378	9 11 10.4	7.64	19 24.3	11	22 55 21.39	0.629	8 2 59.5	3.09	17 34.8
12	22 43 14.25	1.357	9 8 8.5	7.52	19 20.9	12	22 55 36.15	0.601	8 1 47.4	2.92	17 31.1
13	22 43 46.57	1.336	9 5 9.5	7.40	19 17.5	13	22 55 50.25	0.573	8 0 39.4	2.75	17 27.4
14	22 44 18.40	1.315	9 2 13.5	7.28	19 14.1	14	22 56 3.66	0.545	7 59 35.6	2.57	17 23.7
15	22 44 49.72	1.294	8 59 20.3	7.15	19 10.7	15	22 56 16.40	0.517	7 58 36.1	2.39	17 20.0
16	22 45 20.52	1.273	8 56 30.2	7.02	19 7.2	16	22 56 28.46	0.488	7 57 40.8	2.21	17 16.2
17	22 45 50.80	1.250	8 53 43.3	6.89	19 3.8	17	22 56 39.83	0.459	7 56 49.8	2.03	17 12.4
18	22 46 20.56	1.228	8 50 59.5	6.76	19 0.4	18	22 56 50.51	0.430	7 56 3.1	1.85	17 8.7
19	22 46 49.76	1.206	8 48 18.9	6.63	18 57.0	19	22 57 0.49	0.401	7 55 20.7	1.67	17 5.0
20	22 47 18.44	1.183	8 45 41.5	6.49	18 53.5	20	22 57 9.77	0.372	7 54 42.8	1.49	17 1.2
21	22 47 46.57	1.160	8 43 7.4	6.35	18 50.1	21	22 57 18.34	0.343	7 54 9.2	1.31	16 57.4
22	22 48 14.14	1.137	8 40 36.7	6.21	18 46.6	22	22 57 26.20	0.314	7 53 40.1	1.13	16 53.6
23	22 48 41.15	1.114	8 38 9.4	6.07	18 43.1	23	22 57 33.36	0.284	7 53 15.3	0.94	16 49.8
24	22 49 7.60	1.090	8 35 45.4	5.93	18 39.6	24	22 57 39.81	0.254	7 52 54.8	0.76	16 46.0
25	22 49 33.48	1.066	8 33 24.9	5.79	18 36.1	25	22 57 45.54	0.224	7 52 38.8	0.57	16 42.1
26	22 49 58.78	1.042	8 31 7.8	5.64	18 32.6	26	22 57 50.55	0.194	7 52 27.3	0.39	16 38.2
27	22 50 23.50	1.018	8 28 54.3	5.49	18 29.1	27	22 57 54.96	0.164	7 52 20.2	0.20	16 34.3
28	22 50 47.64	0.994	8 26 44.3	5.34	18 25.5	28	22 57 58.44	0.134	7 52 17.5	+0.02	16 30.4
29	22 51 11.18	0.969	8 24 38.0	5.19	18 22.0	29	22 58 1.30	0.104	7 52 19.3	-0.16	16 26.5
30	22 51 34.13	0.944	8 22 35.3	5.04	18 18.4	30	22 58 3.44	0.074	7 52 25.5	0.35	16 22.6
31	22 51 56.49	0.919	8 20 36.3	4.88	18 14.8	31	22 58 4.87	0.045	7 52 36.1	0.54	16 18.7
32	22 52 18.23	+0.894	-8 18 41.0	+4.73	18 11.2	32	22 58 5.57	+0.015	-7 52 51.2	-0.72	16 14.8
Day of the Month.	1st.	11th.	21st.	31st.		Day of the Month.	1st.	11th.	21st.	31st.	
Polar Semidiameter	17.5	18.0	18.5	19.1		Polar Semidiameter	19.2	19.8	20.4	21.1	
Horizontal Parallax	1.6	1.7	1.7	1.8		Horizontal Parallax	1.8	1.9	1.9	2.0	

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	22 58 4.87	+0.045	7 52 36.1	-0.54	16 18.7	1	22 52 58.06	-0.836	8 33 25.4	-5.77	14 11.5
2	22 58 5.57	+0.015	7 52 51.2	0.72	16 14.8	2	22 52 37.70	0.850	8 35 45.3	5.90	14 7.2
3	22 58 5.56	-0.015	7 53 10.7	0.91	16 10.9	3	22 52 16.79	0.863	8 38 8.4	6.02	14 2.9
4	22 58 4.82	0.045	7 53 34.7	1.10	16 7.0	4	22 51 55.33	0.905	8 40 34.4	6.14	13 58.6
5	22 58 3.35	0.075	7 54 3.0	1.36	16 3.0	5	22 51 33.34	0.927	8 43 3.3	6.26	13 54.3
6	22 58 1.16	0.106	7 54 35.8	1.47	15 59.0	6	22 51 10.83	0.948	8 45 35.0	6.38	13 50.0
7	22 57 58.24	0.136	7 55 13.0	1.65	15 55.0	7	22 50 47.82	0.969	8 48 9.4	6.49	13 45.7
8	22 57 54.61	0.167	7 55 54.7	1.84	15 51.0	8	22 50 24.31	0.989	8 50 46.5	6.60	13 41.4
9	22 57 50.26	0.197	7 56 40.9	2.02	15 47.0	9	22 50 0.33	1.009	8 53 26.0	6.70	13 37.1
10	22 57 45.17	0.227	7 57 31.5	2.20	15 43.0	10	22 49 35.89	1.028	8 56 7.9	6.79	13 32.8
11	22 57 39.36	0.257	7 58 26.4	2.38	15 38.9	11	22 49 10.99	1.048	8 58 52.0	6.88	13 28.4
12	22 57 32.84	0.287	7 59 25.6	2.56	15 34.9	12	22 48 45.67	1.064	9 1 38.3	6.97	13 24.0
13	22 57 25.59	0.317	8 0 29.2	2.74	15 30.9	13	22 48 19.94	1.081	9 4 26.7	7.06	13 19.7
14	22 57 17.63	0.347	8 1 37.2	2.92	15 26.8	14	22 47 53.80	1.097	9 7 17.0	7.14	13 15.3
15	22 57 8.95	0.376	8 2 49.4	3.10	15 22.7	15	22 47 27.29	1.119	9 10 9.2	7.21	13 10.9
16	22 56 59.57	0.405	8 4 5.9	3.28	15 18.6	16	22 47 0.41	1.136	9 13 3.1	7.27	13 6.5
17	22 56 49.48	0.434	8 5 26.6	3.45	15 14.5	17	22 46 33.20	1.149	9 15 58.5	7.33	13 2.1
18	22 56 38.69	0.463	8 6 51.5	3.62	15 10.3	18	22 46 5.68	1.153	9 18 55.2	7.39	12 57.7
19	22 56 27.20	0.492	8 8 20.5	3.79	15 6.2	19	22 45 37.86	1.165	9 21 53.1	7.44	12 53.3
20	22 56 15.03	0.521	8 9 53.6	3.96	15 2.0	20	22 45 9.76	1.176	9 24 52.2	7.48	12 48.9
21	22 56 2.17	0.549	8 11 30.7	4.13	14 57.9	21	22 44 41.40	1.186	9 27 52.3	7.52	12 44.5
22	22 55 48.63	0.577	8 13 11.8	4.30	14 53.8	22	22 44 12.82	1.195	9 30 53.2	7.55	12 40.1
23	22 55 34.42	0.605	8 14 56.8	4.45	14 49.6	23	22 43 44.02	1.203	9 33 54.8	7.58	12 35.7
24	22 55 19.56	0.633	8 16 45.6	4.61	14 45.4	24	22 43 15.03	1.211	9 36 57.0	7.60	12 31.3
25	22 55 4.05	0.660	8 18 38.2	4.77	14 41.2	25	22 42 45.87	1.218	9 39 59.7	7.61	12 26.9
26	22 54 47.89	0.686	8 20 34.5	4.92	14 37.0	26	22 42 16.56	1.224	9 43 2.6	7.62	12 22.5
27	22 54 31.10	0.712	8 22 34.5	5.07	14 32.8	27	22 41 47.12	1.229	9 46 5.6	7.63	12 18.0
28	22 54 13.69	0.738	8 24 37.9	5.22	14 28.6	28	22 41 17.58	1.233	9 49 8.7	7.63	12 13.6
29	22 53 55.67	0.763	8 26 44.8	5.36	14 24.4	29	22 40 47.95	1.236	9 52 11.8	7.62	12 9.2
30	22 53 37.06	0.788	8 28 55.0	5.50	14 20.1	30	22 40 18.26	1.238	9 55 14.6	7.61	12 4.8
31	22 53 17.85	0.812	8 31 8.6	5.64	14 15.8	31	22 39 48.54	1.239	9 58 16.9	7.59	12 0.4
32	22 52 58.06	-0.836	8 33 25.4	-5.77	14 11.5	32	22 39 18.81	-1.239	10 1 18.8	-7.56	11 55.9
Day of the Month.						Day of the Month.					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter						Polar Semidiameter					
21.1						22.9					
Horizontal Parallax						Horizontal Parallax					
2.0						2.2					
21.7						23.3					
2.0						2.2					
22.3						23.5					
2.1						2.2					
22.8						23.6					
2.2											

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	22 39 18.81	-1.239	10 1 18.8	-7.56	11 55.9	1	22 26 4.60	-0.841	11 18 9.2	-4.56	9 44.9
2	22 38 49.07	1.238	10 4 20.0	7.53	11 51.5	2	22 25 44.70	0.816	11 19 56.9	4.40	9 40.7
3	22 38 19.35	1.237	10 7 20.5	7.50	11 47.1	3	22 25 25.41	0.791	11 21 40.7	4.94	9 36.5
4	22 37 49.68	1.235	10 10 20.1	7.46	11 42.7	4	22 25 6.73	0.765	11 23 20.6	4.08	9 32.3
5	22 37 20.07	1.232	10 13 18.6	7.41	11 38.3	5	22 24 48.68	0.739	11 24 56.6	3.91	9 28.1
6	22 36 50.55	1.228	10 16 16.1	7.36	11 33.9	6	22 24 31.26	0.712	11 26 28.5	3.74	9 23.9
7	22 36 21.14	1.222	10 19 12.3	7.31	11 29.4	7	22 24 14.49	0.685	11 27 56.4	3.57	9 19.7
8	22 35 51.87	1.216	10 22 7.0	7.25	11 25.0	8	22 23 58.38	0.658	11 29 20.2	3.40	9 15.5
9	22 35 22.75	1.209	10 25 0.3	7.18	11 20.6	9	22 23 42.93	0.630	11 30 39.8	3.23	9 11.3
10	22 34 53.81	1.201	10 27 52.0	7.11	11 16.2	10	22 23 28.16	0.601	11 31 55.3	3.05	9 7.1
11	22 34 25.06	1.192	10 30 41.8	7.03	11 11.8	11	22 23 14.09	0.572	11 33 6.5	2.87	9 2.9
12	22 33 56.54	1.182	10 33 29.8	6.95	11 7.4	12	22 23 0.73	0.542	11 34 13.4	2.69	8 58.7
13	22 33 28.27	1.171	10 36 15.8	6.87	11 3.0	13	22 22 48.08	0.512	11 35 16.0	2.51	8 54.6
14	22 33 0.26	1.159	10 38 59.7	6.78	10 58.4	14	22 22 36.15	0.481	11 36 14.1	2.33	8 50.5
15	22 32 32.53	1.147	10 41 41.3	6.68	10 54.2	15	22 22 24.95	0.451	11 37 7.9	2.15	8 46.4
16	22 32 5.11	1.134	10 44 20.5	6.58	10 49.8	16	22 22 14.48	0.420	11 37 57.2	1.97	8 42.3
17	22 31 38.03	1.120	10 46 57.2	6.47	10 45.5	17	22 22 4.75	0.389	11 38 42.1	1.78	8 38.2
18	22 31 11.30	1.106	10 49 31.8	6.36	10 41.1	18	22 21 55.77	0.358	11 39 22.5	1.59	8 34.1
19	22 30 44.95	1.090	10 52 2.5	6.24	10 36.7	19	22 21 47.55	0.327	11 39 58.4	1.40	8 30.0
20	22 30 19.00	1.073	10 54 30.8	6.12	10 32.4	20	22 21 40.09	0.295	11 40 29.8	1.22	8 25.9
21	22 29 53.46	1.055	10 56 56.2	5.99	10 28.1	21	22 21 33.39	0.263	11 40 56.6	1.03	8 21.9
22	22 29 28.34	1.037	10 59 18.6	5.86	10 23.7	22	22 21 27.47	0.231	11 41 19.0	0.84	8 17.9
23	22 29 3.68	1.018	10 1 37.8	5.73	10 19.3	23	22 21 22.30	0.199	11 41 36.9	0.65	8 13.9
24	22 28 39.49	0.998	11 3 53.8	5.59	10 15.0	24	22 21 17.90	0.167	11 41 50.1	0.46	8 9.9
25	22 28 15.78	0.977	11 6 6.5	5.45	10 10.7	25	22 21 14.29	0.135	11 41 58.9	0.27	8 5.9
26	22 27 52.57	0.956	11 8 15.8	5.31	10 6.4	26	22 21 11.45	0.103	11 42 3.1	-0.08	8 1.9
27	22 27 29.89	0.934	11 10 21.6	5.17	10 2.1	27	22 21 9.37	0.071	11 42 2.9	+0.10	7 57.9
28	22 27 7.74	0.912	11 12 23.9	5.02	9 57.8	28	22 21 8.08	0.038	11 41 58.2	0.28	7 53.9
29	22 26 46.13	0.889	11 14 22.7	4.87	9 53.5	29	22 21 7.55	-0.006	11 41 49.0	0.47	7 49.9
30	22 26 25.08	0.865	11 16 17.8	4.72	9 49.2	30	22 21 7.80	+0.027	11 41 35.5	0.66	7 46.0
31	22 26 4.60	0.841	11 18 9.2	4.56	9 44.9	31	22 21 8.81	0.059	11 41 17.4	0.85	7 42.1
32	22 25 44.70	-0.816	11 19 56.9	-4.40	9 40.7	32	22 21 10.60	+0.091	11 40 54.8	+1.04	7 38.2
Day of the Month.		1st.	11th.	21st.	31st.	Day of the Month.		1st.	11th.	21st.	31st.
Polar Semidiameter		23.6	23.5	23.2	22.8	Polar Semidiameter		23.8	22.3	21.7	21.0
Horizontal Parallax		2.2	2.2	2.2	2.2	Horizontal Parallax		2.2	2.1	2.1	2.0

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	22 21 10.60	+0.001	11 40 54.8	+1.04	7 38.2	1	22 27 51.47	+0.993	10 56 15.9	+ 6.35	5 47.0
2	22 21 13.16	0.123	11 40 27.8	1.22	7 34.3	2	22 28 15.60	1.019	10 53 44.1	6.40	5 43.5
3	22 21 16.50	0.155	11 39 56.3	1.41	7 30.4	3	22 28 40.36	1.045	10 51 8.6	6.56	5 40.0
4	22 21 20.61	0.187	11 39 20.3	1.60	7 26.5	4	22 29 5.73	1.071	10 48 29.5	6.71	5 36.5
5	22 21 25.48	0.219	11 38 39.9	1.78	7 22.7	5	22 29 31.71	1.096	10 45 46.8	6.86	5 33.0
6	22 21 31.12	0.251	11 37 55.2	1.96	7 18.9	6	22 29 58.30	1.121	10 43 0.4	7.01	5 29.5
7	22 21 37.54	0.283	11 37 6.0	2.14	7 15.1	7	22 30 25.50	1.146	10 40 10.5	7.16	5 26.0
8	22 21 44.72	0.315	11 36 12.5	2.32	7 11.3	8	22 30 53.29	1.171	10 37 16.9	7.31	5 22.5
9	22 21 52.66	0.347	11 35 14.5	2.50	7 7.5	9	22 31 21.68	1.195	10 34 19.8	7.46	5 19.1
10	22 22 1.36	0.379	11 34 12.1	2.69	7 3.7	10	22 31 50.65	1.219	10 31 19.2	7.60	5 15.7
11	22 22 10.81	0.410	11 33 5.4	2.87	7 0.0	11	22 32 20.19	1.243	10 28 15.2	7.74	5 12.2
12	22 22 21.02	0.441	11 31 54.2	3.05	6 56.3	12	22 32 50.29	1.266	10 25 7.7	7.88	5 8.8
13	22 22 31.98	0.472	11 30 38.8	3.23	6 52.5	13	22 33 20.95	1.289	10 21 56.8	8.02	5 5.4
14	22 22 43.68	0.503	11 29 19.1	3.40	6 48.8	14	22 33 52.16	1.312	10 18 42.6	8.16	5 2.0
15	22 22 56.13	0.534	11 27 55.2	3.58	6 45.1	15	22 34 23.92	1.335	10 15 25.0	8.30	4 58.6
16	22 23 9.31	0.565	11 26 27.0	3.76	6 41.4	16	22 34 56.22	1.357	10 12 4.1	8.44	4 55.2
17	22 23 23.22	0.595	11 24 54.6	3.94	6 37.7	17	22 35 29.05	1.379	10 8 40.0	8.57	4 51.8
18	22 23 37.86	0.625	11 23 18.0	4.11	6 34.0	18	22 36 2.40	1.400	10 5 12.7	8.70	4 48.5
19	22 23 53.23	0.655	11 21 37.2	4.28	6 30.3	19	22 36 36.26	1.421	10 1 42.3	8.83	4 45.1
20	22 24 9.32	0.685	11 19 52.2	4.45	6 26.7	20	22 37 10.61	1.442	9 58 8.8	8.96	4 41.7
21	22 24 26.11	0.714	11 18 3.2	4.63	6 23.0	21	22 37 45.46	1.463	9 54 32.1	9.09	4 38.3
22	22 24 43.60	0.743	11 16 10.1	4.79	6 19.4	22	22 38 20.80	1.483	9 50 52.3	9.22	4 35.0
23	22 25 1.77	0.772	11 14 13.1	4.96	6 15.8	23	22 38 56.62	1.503	9 47 9.6	9.34	4 31.6
24	22 25 20.64	0.800	11 12 12.0	5.13	6 12.2	24	22 39 32.91	1.522	9 43 24.0	9.46	4 28.3
25	22 25 40.19	0.829	11 10 7.0	5.29	6 8.6	25	22 40 9.66	1.541	9 39 35.5	9.58	4 25.0
26	22 26 0.43	0.857	11 7 58.1	5.45	6 5.0	26	22 40 46.88	1.560	9 35 44.1	9.70	4 21.7
27	22 26 21.34	0.885	11 5 45.4	5.61	6 1.4	27	22 41 24.53	1.578	9 31 49.8	9.82	4 18.4
28	22 26 42.90	0.912	11 3 28.8	5.77	5 57.8	28	22 42 2.63	1.596	9 27 52.7	9.94	4 15.1
29	22 27 5.11	0.939	11 1 8.3	5.93	5 54.2	29	22 42 41.17	1.614	9 23 52.9	10.06	4 11.8
30	22 27 27.97	0.966	10 58 44.0	6.09	5 50.6	30	22 43 20.13	1.632	9 19 50.3	10.17	4 8.5
31	22 27 51.47	0.993	10 56 15.9	6.25	5 47.0	31	22 43 59.51	1.649	9 15 45.0	10.28	4 5.2
32	22 28 15.60	+1.019	10 53 44.1	+6.40	5 43.5	32	22 44 39.29	+1.666	9 11 37.0	+10.39	4 1.9
Day of the Month.						Day of the Month.					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter						Polar Semidiameter					
Horizontal Parallax						Horizontal Parallax					
21.0						19.0					
2.0						1.8					
20.3						18.4					
1.9						1.7					
19.6						17.9					
1.8						1.7					
19.0						17.4					
1.8						1.6					

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	23 53 2.64	+0.511	-3 15 24.6	+3.88	5 9.2	1	0 1 52.42	+0.888	-2 12 5.8	+6.16	3 16.1
2	23 53 15.07	0.536	3 13 50.4	3.97	5 5.5	2	0 2 13.84	0.897	2 9 37.5	6.21	3 12.5
3	23 53 27.86	0.540	3 12 14.1	4.06	5 1.8	3	0 2 35.50	0.906	2 7 7.8	6.26	3 9.0
4	23 53 40.99	0.554	3 10 35.7	4.15	4 58.0	4	0 2 57.36	0.915	2 4 37.0	6.31	3 5.4
5	23 53 54.44	0.568	3 8 55.1	4.23	4 54.3	5	0 3 19.45	0.924	2 2 4.9	6.36	3 1.8
6	23 54 8.24	0.582	3 7 12.6	4.32	4 50.6	6	0 3 41.74	0.933	1 59 31.7	6.41	2 58.3
7	23 54 22.37	0.595	3 5 28.0	4.40	4 46.9	7	0 4 4.24	0.942	1 56 57.2	6.46	2 54.7
8	23 54 36.82	0.609	3 3 41.4	4.48	4 43.2	8	0 4 26.94	0.950	1 54 21.7	6.51	2 51.1
9	23 54 51.59	0.623	3 1 52.8	4.56	4 39.5	9	0 4 49.85	0.958	1 51 44.9	6.56	2 47.6
10	23 55 6.69	0.635	3 0 2.2	4.64	4 35.9	10	0 5 12.95	0.966	1 49 7.1	6.60	2 44.0
11	23 55 22.09	0.648	2 58 9.7	4.72	4 32.2	11	0 5 36.24	0.974	1 46 28.2	6.64	2 40.5
12	23 55 37.81	0.661	2 56 15.3	4.80	4 28.5	12	0 5 59.72	0.982	1 43 48.3	6.68	2 36.9
13	23 55 53.85	0.674	2 54 19.0	4.88	4 24.9	13	0 6 23.39	0.990	1 41 7.3	6.72	2 33.4
14	23 56 10.18	0.687	2 52 20.9	4.96	4 21.2	14	0 6 47.24	0.998	1 38 25.4	6.76	2 29.9
15	23 56 26.82	0.699	2 50 20.9	5.04	4 17.6	15	0 7 11.26	1.005	1 35 42.6	6.80	2 26.3
16	23 56 43.76	0.712	2 48 19.1	5.11	4 13.9	16	0 7 35.46	1.012	1 32 58.8	6.84	2 22.8
17	23 57 1.00	0.724	2 46 15.5	5.19	4 10.3	17	0 7 59.82	1.019	1 30 14.0	6.88	2 19.3
18	23 57 18.53	0.737	2 44 10.2	5.26	4 6.6	18	0 8 24.35	1.026	1 27 28.4	6.91	2 15.7
19	23 57 36.35	0.749	2 42 3.1	5.34	4 3.0	19	0 8 49.03	1.033	1 24 42.0	6.95	2 12.2
20	23 57 54.46	0.761	2 39 54.3	5.41	3 59.4	20	0 9 13.87	1.039	1 21 54.8	6.98	2 8.7
21	23 58 12.85	0.772	2 37 43.8	5.48	3 55.7	21	0 9 38.87	1.045	1 19 6.7	7.01	2 5.2
22	23 58 31.51	0.784	2 35 31.6	5.55	3 52.1	22	0 10 4.01	1.051	1 16 18.0	7.04	2 1.7
23	23 58 50.45	0.795	2 33 17.9	5.61	3 48.5	23	0 10 29.29	1.057	1 13 28.5	7.07	1 58.2
24	23 59 9.65	0.806	2 31 2.5	5.68	3 44.9	24	0 10 54.72	1.063	1 10 38.5	7.10	1 54.6
25	23 59 29.12	0.817	2 28 45.6	5.74	3 41.3	25	0 11 20.26	1.067	1 7 47.7	7.13	1 51.1
26	23 59 48.85	0.828	2 26 27.1	5.81	3 37.7	26	0 11 45.93	1.072	1 4 56.3	7.16	1 47.6
27	0 0 8.82	0.838	2 24 7.1	5.87	3 34.1	27	0 12 11.72	1.077	1 2 4.3	7.18	1 44.1
28	0 0 29.06	0.849	2 21 45.6	5.93	3 30.5	28	0 12 37.64	1.082	0 59 11.8	7.20	1 40.6
29	0 0 49.54	0.859	2 19 22.7	5.99	3 26.9	29	0 13 3.66	1.087	0 56 18.7	7.22	1 37.1
30	0 1 10.27	0.869	2 16 58.4	6.06	3 23.3	30	0 13 29.80	1.091	0 53 25.2	7.24	1 33.6
31	0 1 31.23	0.878	2 14 32.8	6.10	3 19.7	31	0 13 56.05	1.095	0 50 31.2	7.26	1 30.1
32	0 1 52.42	+0.888	-2 12 5.8	+6.16	3 16.1	32	0 14 22.39	+1.099	-0 47 36.8	+7.28	1 26.6
Day of the Month.						Day of the Month.					
Polar Semidiameter						Polar Semidiameter					
Horizontal Parallax						Horizontal Parallax					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
8.1						7.7					
7.9						7.6					
0.9						0.9					
0.9						0.9					
0.9						0.9					
0.9						0.8					

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	m h	
1	0 13 3.66	+1.067	-0 56 18.7	+7.22	1 37.1	1	0 27 4.71	+1.146	+0 34 55.3	+7.30	23 45.7
2	0 13 29.80	1.001	0 53 25.2	7.34	1 33.6	2	0 27 32.21	1.146	0 37 50.5	7.38	23 42.2
3	0 13 56.05	1.005	0 50 31.2	7.36	1 30.1	3	0 27 59.70	1.145	0 40 45.3	7.37	23 38.7
4	0 14 22.39	1.009	0 47 36.8	7.38	1 26.6	4	0 28 27.16	1.144	0 43 39.7	7.25	23 35.3
5	0 14 48.83	1.003	0 44 41.9	7.30	1 23.1	5	0 28 54.60	1.143	0 46 33.6	7.23	23 31.8
6	0 15 15.36	1.107	0 41 46.7	7.31	1 19.6	6	0 29 22.00	1.141	0 49 27.1	7.31	23 28.3
7	0 15 41.98	1.111	0 38 51.2	7.33	1 16.1	7	0 29 49.36	1.139	0 52 20.1	7.19	23 24.8
8	0 16 8.69	1.114	0 35 55.2	7.34	1 12.6	8	0 30 16.08	1.138	0 55 12.5	7.17	23 21.3
9	0 16 35.47	1.117	0 32 59.0	7.35	1 9.2	9	0 30 43.96	1.136	0 58 4.4	7.15	23 17.9
10	0 17 2.33	1.120	0 30 2.4	7.36	1 5.7	10	0 31 11.19	1.134	1 0 55.8	7.13	23 14.4
11	0 17 29.27	1.123	0 27 5.7	7.37	1 2.2	11	0 31 38.37	1.132	1 3 46.6	7.11	23 10.9
12	0 17 56.27	1.126	0 24 8.7	7.38	0 58.7	12	0 32 5.50	1.129	1 6 36.8	7.08	23 7.4
13	0 18 23.35	1.129	0 21 11.6	7.39	0 55.2	13	0 32 32.58	1.127	1 9 26.5	7.06	23 3.9
14	0 18 50.49	1.128	0 18 14.2	7.40	0 51.7	14	0 32 59.68	1.124	1 12 15.4	7.03	23 0.4
15	0 19 17.67	1.134	0 15 16.6	7.40	0 48.3	15	0 33 26.52	1.121	1 15 3.6	7.00	22 57.0
16	0 19 44.91	1.137	0 12 19.0	7.40	0 44.8	16	0 33 53.39	1.118	1 17 51.1	6.97	22 53.5
17	0 20 12.21	1.139	0 9 21.3	7.41	0 41.3	17	0 34 20.17	1.115	1 20 37.8	6.94	22 50.0
18	0 20 39.55	1.140	0 6 23.5	7.41	0 37.8	18	0 34 46.89	1.112	1 23 23.9	6.91	22 46.5
19	0 21 6.93	1.143	0 3 25.7	7.41	0 34.3	19	0 35 13.52	1.108	1 26 9.2	6.87	22 43.0
20	0 21 34.35	1.144	-0 0 27.8	7.41	0 30.9	20	0 35 40.07	1.105	1 28 53.6	6.84	22 39.5
21	0 22 1.81	1.145	+0 2 30.0	7.40	0 27.4	21	0 36 6.53	1.101	1 31 37.2	6.80	22 36.0
22	0 22 29.29	1.146	0 5 27.7	7.40	0 23.9	22	0 36 32.89	1.097	1 34 19.9	6.78	22 32.5
23	0 22 56.80	1.147	0 8 25.4	7.39	0 20.4	23	0 36 59.15	1.092	1 37 1.7	6.73	22 29.0
24	0 23 24.33	1.147	0 11 22.9	7.39	0 17.0	24	0 37 25.31	1.088	1 39 42.5	6.68	22 25.5
25	0 23 51.86	1.148	0 14 20.3	7.38	0 13.5	25	0 37 51.35	1.083	1 42 22.4	6.64	22 22.0
26	0 24 19.42	1.148	0 17 17.6	7.38	0 10.0	26	0 38 17.29	1.078	1 45 1.3	6.60	22 18.5
27	0 24 46.98	1.148	0 20 14.5	7.37	0 6.5	27	0 38 43.10	1.073	1 47 39.2	6.56	22 15.0
28	0 25 14.54	1.148	0 23 11.3	7.36	0 3.1	28	0 39 8.79	1.068	1 50 16.1	6.52	22 11.5
29	0 25 42.10	1.148	0 26 7.7	7.35	23 56.1	29	0 39 34.35	1.063	1 52 52.0	6.47	22 8.0
30	0 26 9.65	1.147	0 29 3.9	7.33	23 52.6	30	0 39 59.80	1.058	1 55 26.8	6.43	22 4.5
31	0 26 37.18	1.147	0 31 59.7	7.33	23 49.1	31	0 40 25.12	1.052	1 58 0.5	6.38	22 1.0
32	0 27 4.71	+1.146	+0 34 55.3	+7.30	23 45.7	32	0 40 50.30	+1.046	+2 0 33.1	+6.33	21 57.5
Day of the Month.	1st.	11th.	21st.	31st.		Day of the Month.	1st.	11th.	21st.	31st.	
Polar Semidiameter	7.5	7.5	7.5	7.5		Polar Semidiameter	7.5	7.5	7.5	7.6	
Horizontal Parallax	0.8	0.8	0.8	0.8		Horizontal Parallax	0.8	0.8	0.8	0.9	

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.



## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	0 40 25.12	+1.052	+1 58 0.5	+6.38	22 1.0	1	0 52 4.89	+0.804	+3 6 24.1	+4.50	20 10.7
2	0 40 50.30	1.046	2 0 33.1	6.33	21 57.5	2	0 52 24.05	0.793	3 8 11.3	4.43	20 7.0
3	0 41 15.34	1.040	2 3 4.5	6.28	21 53.9	3	0 52 42.96	0.783	3 9 56.6	4.35	20 3.4
4	0 41 40.24	1.034	2 5 34.8	6.24	21 50.4	4	0 53 1.61	0.772	3 11 40.2	4.26	19 59.8
5	0 42 4.99	1.028	2 8 3.9	6.19	21 46.9	5	0 53 20.01	0.761	3 13 21.9	4.20	19 56.2
6	0 42 29.60	1.022	2 10 31.9	6.14	21 43.4	6	0 53 38.15	0.750	3 15 1.8	4.13	19 52.5
7	0 42 54.06	1.015	2 12 58.6	6.09	21 39.9	7	0 53 56.01	0.738	3 16 39.9	4.05	19 48.9
8	0 43 18.35	1.009	2 15 24.1	6.04	21 36.3	8	0 54 13.62	0.727	3 18 16.1	3.97	19 45.2
9	0 43 42.49	1.002	2 17 48.3	5.98	21 32.8	9	0 54 30.95	0.716	3 19 50.4	3.89	19 41.6
10	0 44 6.47	0.995	2 20 11.2	5.93	21 29.3	10	0 54 48.01	0.705	3 21 22.8	3.81	19 37.9
11	0 44 30.28	0.988	2 22 32.8	5.87	21 25.7	11	0 55 4.78	0.693	3 22 53.2	3.73	19 34.3
12	0 44 53.92	0.981	2 24 53.1	5.82	21 22.2	12	0 55 21.27	0.682	3 24 21.6	3.65	19 30.6
13	0 45 17.39	0.974	2 27 12.1	5.76	21 18.6	13	0 55 37.47	0.670	3 25 48.1	3.57	19 26.9
14	0 45 40.68	0.966	2 29 29.7	5.70	21 15.1	14	0 55 53.38	0.657	3 27 12.6	3.48	19 23.3
15	0 46 3.79	0.959	2 31 46.0	5.64	21 11.5	15	0 56 9.00	0.645	3 28 35.1	3.40	19 19.6
16	0 46 26.71	0.951	2 34 0.7	5.58	21 8.0	16	0 56 24.33	0.633	3 29 55.5	3.31	19 15.9
17	0 46 49.44	0.943	2 36 14.0	5.52	21 4.4	17	0 56 39.35	0.620	3 31 14.0	3.23	19 12.2
18	0 47 11.97	0.935	2 38 25.8	5.46	21 0.9	18	0 56 54.07	0.607	3 32 30.3	3.14	19 8.5
19	0 47 34.32	0.927	2 40 36.1	5.40	20 57.3	19	0 57 8.47	0.594	3 33 44.6	3.05	19 4.8
20	0 47 56.45	0.918	2 42 44.9	5.34	20 53.8	20	0 57 22.57	0.581	3 34 56.7	2.96	19 1.1
21	0 48 18.37	0.909	2 44 52.1	5.27	20 50.2	21	0 57 36.36	0.568	3 36 6.7	2.87	18 57.4
22	0 48 40.09	0.901	2 46 57.9	5.20	20 46.6	22	0 57 49.83	0.554	3 37 14.5	2.78	18 53.7
23	0 49 1.59	0.892	2 49 2.0	5.13	20 43.0	23	0 58 2.97	0.541	3 38 20.3	2.70	18 50.0
24	0 49 22.88	0.883	2 51 4.5	5.07	20 39.4	24	0 58 15.79	0.528	3 39 23.8	2.61	18 46.3
25	0 49 43.94	0.873	2 53 5.3	5.00	20 35.9	25	0 58 28.29	0.514	3 40 25.3	2.52	18 42.5
26	0 50 4.78	0.864	2 55 4.6	4.93	20 32.3	26	0 58 40.46	0.500	3 41 24.5	2.42	18 38.8
27	0 50 25.39	0.854	2 57 2.1	4.86	20 28.7	27	0 58 52.29	0.486	3 42 21.5	2.33	18 35.1
28	0 50 45.77	0.844	2 58 58.0	4.79	20 25.1	28	0 59 3.80	0.472	3 43 16.4	2.24	18 31.3
29	0 51 5.91	0.834	3 0 52.2	4.72	20 21.5	29	0 59 14.96	0.458	3 44 9.1	2.15	18 27.6
30	0 51 25.81	0.824	3 2 44.5	4.64	20 17.9	30	0 59 25.79	0.444	3 44 59.6	2.06	18 23.8
31	0 51 45.48	0.814	3 4 35.2	4.57	20 14.3	31	0 59 36.28	0.430	3 45 47.8	1.97	18 20.0
32	0 52 4.89	+0.804	+3 6 24.1	+4.50	20 10.7	32	0 59 46.43	+0.415	+3 46 33.8	+1.87	18 16.3
Day of the Month.	1st.	11th.	21st.	31st.		Day of the Month.	1st.	11th.	21st.	31st.	
Polar Semidiameter	7.6	7.6	7.7	7.8		Polar Semidiameter	7.8	8.0	8.1	8.2	
Horizontal Parallax	0.9	0.9	0.9	0.9		Horizontal Parallax	0.9	0.9	0.9	0.9	

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	h m s 0 59 36.28	+0.430	+3 45 47.8	+1.97	h m 18 20.0	1	h m s 1 2 1.61	-0.048	+3 51 36.6	-1.04	h m 16 20.4
2	0 59 46.43	0.415	3 46 33.8	1.87	18 16.3	2	1 2 0.27	0.064	3 51 10.6	1.14	16 16.5
3	0 59 56.23	0.401	3 47 17.6	1.78	18 12.5	3	1 1 58.56	0.079	3 50 42.2	1.23	16 12.5
4	1 0 5.68	0.387	3 47 59.1	1.68	18 8.7	4	1 1 56.47	0.085	3 50 11.6	1.33	16 8.6
5	1 0 14.79	0.372	3 48 34.2	1.58	18 4.9	5	1 1 54.01	0.111	3 49 38.7	1.42	16 4.6
6	1 0 23.54	0.357	3 49 15.2	1.48	18 1.1	6	1 1 51.17	0.127	3 49 3.6	1.51	16 0.6
7	1 0 31.94	0.343	3 49 49.9	1.39	17 57.3	7	1 1 47.96	0.142	3 48 26.1	1.60	15 56.6
8	1 0 39.98	0.328	3 50 22.3	1.30	17 53.5	8	1 1 44.37	0.158	3 47 46.5	1.70	15 52.6
9	1 0 47.67	0.312	3 50 52.4	1.21	17 49.7	9	1 1 40.41	0.173	3 47 4.7	1.79	15 48.6
10	1 0 54.99	0.298	3 51 20.2	1.11	17 45.9	10	1 1 36.07	0.189	3 46 20.5	1.88	15 44.6
11	1 1 1.96	0.283	3 51 45.6	1.01	17 42.1	11	1 1 31.36	0.204	3 45 34.2	1.97	15 40.6
12	1 1 8.56	0.267	3 52 8.7	0.91	17 38.3	12	1 1 26.29	0.219	3 44 45.7	2.06	15 36.6
13	1 1 14.79	0.252	3 52 29.4	0.82	17 34.4	13	1 1 20.85	0.234	3 43 55.1	2.15	15 32.6
14	1 1 20.66	0.236	3 52 47.8	0.72	17 30.6	14	1 1 15.05	0.250	3 43 2.3	2.24	15 28.5
15	1 1 26.15	0.221	3 53 3.9	0.62	17 26.7	15	1 1 8.88	0.265	3 42 7.4	2.33	15 24.5
16	1 1 31.27	0.205	3 53 17.6	0.52	17 22.9	16	1 1 2.35	0.280	3 41 10.4	2.42	15 20.4
17	1 1 36.01	0.190	3 53 29.0	0.42	17 19.0	17	1 0 55.47	0.295	3 40 11.4	2.50	15 16.4
18	1 1 40.38	0.174	3 53 38.0	0.32	17 15.2	18	1 0 48.22	0.309	3 39 10.3	2.59	15 12.3
19	1 1 44.37	0.158	3 53 44.6	0.23	17 11.3	19	1 0 40.64	0.323	3 38 7.2	2.67	15 8.3
20	1 1 47.98	0.142	3 53 48.8	0.13	17 7.4	20	1 0 32.70	0.338	3 37 2.0	2.75	15 4.2
21	1 1 51.20	0.126	3 53 50.7	+0.03	17 3.5	21	1 0 24.42	0.352	3 35 54.9	2.83	15 0.1
22	1 1 54.04	0.110	3 53 50.2	-0.07	16 59.6	22	1 0 15.81	0.366	3 34 45.9	2.91	14 56.0
23	1 1 56.51	0.095	3 53 47.3	0.17	16 55.7	23	1 0 6.85	0.380	3 33 35.0	2.99	14 52.0
24	1 1 58.00	0.079	3 53 42.1	0.27	16 51.8	24	0 59 57.57	0.394	3 32 22.2	3.07	14 47.9
25	1 2 0.31	0.063	3 53 34.6	0.37	16 47.9	25	0 59 47.96	0.407	3 31 7.6	3.15	14 43.8
26	1 2 1.65	0.047	3 53 24.7	0.46	16 44.0	26	0 59 38.04	0.420	3 29 51.3	3.23	14 39.7
27	1 2 2.59	0.031	3 53 12.5	0.56	16 40.1	27	0 59 27.79	0.433	3 28 33.1	3.30	14 35.6
28	1 2 3.16	+0.015	3 52 58.0	0.65	16 36.2	28	0 59 17.24	0.446	3 27 13.2	3.37	14 31.5
29	1 2 3.35	-0.001	3 52 41.1	0.75	16 32.3	29	0 59 6.38	0.458	3 25 51.7	3.44	14 27.3
30	1 2 3.15	0.017	3 52 21.9	0.85	16 28.3	30	0 58 55.22	0.471	3 24 28.4	3.51	14 23.2
31	1 2 2.57	0.033	3 52 0.4	0.95	16 24.4	31	0 58 43.76	0.483	3 23 3.6	3.57	14 19.1
32	1 2 1.61	-0.048	+3 51 36.6	-1.04	16 20.4	32	0 58 32.01	-0.495	+3 21 37.2	-3.64	14 15.0
Day of the Month.						Day of the Month.					
Polar Semidiameter						Polar Semidiameter					
Horizontal Parallax						Horizontal Parallax					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
8.2						8.7					
0.9						1.0					
8.4						8.8					
1.0						1.0					
8.5						8.9					
1.0						1.0					
8.7						9.1					
1.0						1.0					

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	0 58 32.01	-0.485	+3 21 37.2	-3.64	14 15.0	1	0 50 57.16	-0.718	+2 29 54.9	-4.63	12 9.4
2	0 58 19.98	0.507	3 20 9.3	3.70	14 10.8	2	0 50 39.91	0.720	2 28 3.3	4.64	12 5.2
3	0 58 7.67	0.519	3 18 39.9	3.78	14 6.7	3	0 50 22.61	0.722	2 26 11.9	4.64	12 1.0
4	0 57 55.08	0.530	3 17 9.0	3.82	14 2.5	4	0 50 5.28	0.723	2 24 20.5	4.63	11 56.8
5	0 57 42.23	0.541	3 15 36.6	3.88	13 58.4	5	0 49 47.92	0.724	2 22 29.5	4.62	11 52.6
6	0 57 29.12	0.552	3 14 2.8	3.94	13 54.3	6	0 49 30.56	0.724	2 20 38.6	4.61	11 48.3
7	0 57 15.74	0.563	3 12 27.6	3.99	13 50.1	7	0 49 13.18	0.724	2 18 49.2	4.60	11 44.1
8	0 57 2.13	0.573	3 10 51.2	4.04	13 45.9	8	0 48 55.81	0.724	2 16 58.0	4.58	11 39.9
9	0 56 48.26	0.583	3 9 13.5	4.09	13 41.8	9	0 48 38.44	0.723	2 15 8.3	4.56	11 35.7
10	0 56 34.16	0.593	3 7 34.7	4.14	13 37.6	10	0 48 21.10	0.721	2 13 19.1	4.54	11 31.4
11	0 56 19.82	0.602	3 5 54.6	4.19	13 33.4	11	0 48 3.79	0.719	2 11 30.5	4.51	11 27.2
12	0 56 5.25	0.611	3 4 13.5	4.24	13 29.3	12	0 47 46.53	0.717	2 9 42.4	4.49	11 23.0
13	0 55 50.48	0.620	3 2 31.3	4.28	13 25.1	13	0 47 29.33	0.715	2 7 55.2	4.46	11 18.8
14	0 55 35.49	0.628	3 0 48.1	4.32	13 20.9	14	0 47 12.18	0.713	2 6 8.6	4.43	11 14.6
15	0 55 20.32	0.636	2 59 3.9	4.36	13 16.7	15	0 46 55.12	0.710	2 4 22.8	4.39	11 10.4
16	0 55 4.94	0.644	2 57 18.9	4.39	13 12.5	16	0 46 38.13	0.706	2 2 37.9	4.35	11 6.2
17	0 54 49.38	0.652	2 55 33.0	4.43	13 8.3	17	0 46 21.23	0.702	2 0 54.0	4.31	11 2.0
18	0 54 33.65	0.660	2 53 46.3	4.46	13 4.1	18	0 46 4.43	0.696	1 59 11.0	4.27	10 57.7
19	0 54 17.74	0.667	2 51 58.9	4.49	12 59.9	19	0 45 47.75	0.693	1 57 29.2	4.22	10 53.5
20	0 54 1.67	0.673	2 50 10.8	4.52	12 55.7	20	0 45 31.18	0.687	1 55 48.6	4.17	10 49.3
21	0 53 45.46	0.679	2 48 22.1	4.54	12 51.5	21	0 45 14.75	0.682	1 54 9.0	4.12	10 45.1
22	0 53 29.11	0.684	2 46 32.9	4.56	12 47.3	22	0 44 58.46	0.676	1 52 30.8	4.07	10 40.9
23	0 53 12.62	0.689	2 44 43.2	4.58	12 43.1	23	0 44 42.30	0.669	1 50 53.7	4.02	10 36.7
24	0 52 56.02	0.694	2 42 53.1	4.60	12 38.9	24	0 44 26.32	0.662	1 49 18.0	3.96	10 32.5
25	0 52 39.31	0.699	2 41 2.6	4.61	12 34.7	25	0 44 10.49	0.655	1 47 43.7	3.90	10 28.3
26	0 52 22.49	0.703	2 39 11.8	4.62	12 30.5	26	0 43 54.85	0.648	1 46 10.8	3.83	10 24.1
27	0 52 5.58	0.707	2 37 20.7	4.63	12 26.3	27	0 43 39.39	0.640	1 44 39.4	3.77	10 20.0
28	0 51 48.58	0.710	2 35 29.5	4.64	12 22.1	28	0 43 24.12	0.633	1 43 9.6	3.71	10 15.8
29	0 51 31.51	0.713	2 33 38.0	4.65	12 17.9	29	0 43 9.03	0.624	1 41 41.3	3.64	10 11.6
30	0 51 14.36	0.715	2 31 46.5	4.65	12 13.6	30	0 42 54.16	0.615	1 40 14.6	3.57	10 7.4
31	0 50 57.16	0.718	2 29 54.9	4.65	12 9.4	31	0 42 39.50	0.606	1 38 49.7	3.50	10 3.2
32	0 50 39.91	-0.720	+2 28 3.3	-4.64	12 5.2	32	0 42 25.06	-0.507	+1 37 26.4	-3.43	9 59.1
Day of the Month.		1st.	11th.	21st.	31st.	Day of the Month.		1st.	11th.	21st.	31st.
Polar Semidiameter		9".1	9".2	9".2	9".3	Polar Semidiameter		9".3	9".3	9".2	9".2
Horizontal Parallax		1.0	1.0	1.0	1.0	Horizontal Parallax		1.0	1.0	1.0	1.0

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	0 42 25.06	-0.597	+1 37 26.4	-3.43	9 59.1	1	0 37 28.05	-0.195	+1 12 15.6	-0.59	7 56.3
2	0 42 10.85	0.587	1 36 4.9	3.36	9 54.9	2	0 37 23.54	0.179	1 12 2.6	0.48	7 52.3
3	0 41 56.88	0.577	1 34 45.2	3.29	9 50.8	3	0 37 19.43	0.163	1 11 52.3	0.37	7 48.3
4	0 41 43.16	0.567	1 33 27.3	3.21	9 46.6	4	0 37 15.71	0.147	1 11 44.6	0.26	7 44.3
5	0 41 29.68	0.556	1 32 11.3	3.13	9 42.5	5	0 37 12.37	0.131	1 11 39.5	0.16	7 40.3
6	0 41 16.46	0.545	1 30 57.3	3.05	9 38.3	6	0 37 9.43	0.114	1 11 37.0	-0.05	7 36.3
7	0 41 3.50	0.534	1 29 45.1	2.96	9 34.2	7	0 37 6.89	0.098	1 11 37.1	+0.06	7 32.3
8	0 40 50.82	0.523	1 28 35.1	2.88	9 30.0	8	0 37 4.73	0.081	1 11 39.8	0.17	7 28.4
9	0 40 38.42	0.511	1 27 27.1	2.79	9 25.9	9	0 37 2.98	0.065	1 11 45.3	0.26	7 24.4
10	0 40 26.29	0.500	1 26 21.1	2.70	9 21.8	10	0 37 1.62	0.048	1 11 53.3	0.40	7 20.5
11	0 40 14.45	0.487	1 25 17.4	2.61	9 17.6	11	0 37 0.66	0.032	1 12 4.0	0.51	7 16.5
12	0 40 2.93	0.474	1 24 15.7	2.52	9 13.5	12	0 37 0.12	-0.015	1 12 17.4	0.62	7 12.6
13	0 39 51.71	0.461	1 23 16.3	2.43	9 9.4	13	0 36 59.97	+0.002	1 12 33.5	0.73	7 8.6
14	0 39 40.80	0.448	1 22 19.1	2.34	9 5.3	14	0 37 0.23	0.019	1 12 52.1	0.84	7 4.7
15	0 39 30.21	0.435	1 21 24.2	2.24	9 1.2	15	0 37 0.90	0.036	1 13 13.5	0.95	7 0.8
16	0 39 19.94	0.421	1 20 31.7	2.14	8 57.1	16	0 37 1.97	0.053	1 13 37.4	1.06	6 56.9
17	0 39 10.00	0.407	1 19 41.5	2.04	8 53.0	17	0 37 3.45	0.070	1 14 4.1	1.17	6 52.9
18	0 39 0.40	0.393	1 18 53.6	1.94	8 48.9	18	0 37 5.33	0.087	1 14 33.2	1.28	6 49.0
19	0 38 51.15	0.378	1 18 8.1	1.84	8 44.8	19	0 37 7.61	0.103	1 15 4.9	1.38	6 45.1
20	0 38 42.24	0.364	1 17 25.1	1.74	8 40.7	20	0 37 10.31	0.120	1 15 39.3	1.49	6 41.3
21	0 38 33.68	0.349	1 16 44.5	1.64	8 36.7	21	0 37 13.40	0.137	1 16 16.2	1.59	6 37.4
22	0 38 25.47	0.334	1 16 6.4	1.54	8 32.6	22	0 37 16.90	0.153	1 16 55.7	1.70	6 33.5
23	0 38 17.61	0.319	1 15 30.6	1.43	8 28.5	23	0 37 20.80	0.170	1 17 37.7	1.81	6 29.7
24	0 38 10.12	0.304	1 14 57.4	1.33	8 24.5	24	0 37 25.10	0.187	1 18 22.3	1.92	6 25.8
25	0 38 3.00	0.289	1 14 26.7	1.23	8 20.5	25	0 37 29.79	0.203	1 19 9.3	2.03	6 21.9
26	0 37 56.24	0.274	1 13 58.4	1.12	8 16.4	26	0 37 34.88	0.220	1 19 59.0	2.13	6 18.1
27	0 37 49.86	0.258	1 13 32.8	1.01	8 12.4	27	0 37 40.35	0.237	1 20 51.2	2.23	6 14.3
28	0 37 43.84	0.244	1 13 9.6	0.91	8 8.3	28	0 37 46.23	0.253	1 21 45.8	2.33	6 10.4
29	0 37 38.20	0.227	1 12 49.1	0.80	8 4.3	29	0 37 52.49	0.270	1 22 42.9	2.43	6 6.6
30	0 37 32.93	0.211	1 12 31.1	0.69	8 0.3	30	0 37 59.15	0.286	1 23 42.4	2.53	6 2.8
31	0 37 28.05	0.195	1 12 15.6	0.59	7 56.3	31	0 38 6.20	0.302	1 24 44.3	2.63	5 59.0
32	0 37 23.54	-0.179	+1 12 2.6	-0.46	7 52.3	32	0 38 13.63	+0.318	+1 25 48.7	+2.73	5 55.2
Day of the Month.	1st.	11th.	21st.	31st.		Day of the Month.	1st.	11th.	21st.	31st.	
Polar Semidiameter	9.2	9.1	8.9	8.8		Polar Semidiameter	8.8	8.7	8.5	8.4	
Horizontal Parallax	0	1.0	1.0	1.0		Horizontal Parallax	1.0	1.0	1.0	0.9	

+ prefixed to the hourly change of declination, indicates that north declinations are increasing and south declinations are decreasing; — indicates that north declinations are decreasing and south declinations increasing.

# 242 MOON'S LONGITUDE, &c., 1879.

FOR GRENNICH MEAN NOON AND MIDNIGHT.						
Day of Month.	JANUARY.		FEBRUARY.		MARCH.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	20° 43' 26.3	+ 5° 6' 44.3	64° 32' 9.7	+ 4° 33' 13.2	72° 26' 37.7	+ 4° 1' 57.2
1.5	26 39 47.2	5 11 42.2	70 42 6.6	4 14 24.3	78 34 33.8	3 39 37.9
2.0	32 37 11.5	5 14 20.0	76 56 14.6	3 52 22.8	84 46 37.3	3 14 29.7
2.5	38 36 11.9	5 13 34.0	83 15 0.1	3 27 16.7	91 3 23.6	2 46 42.8
3.0	44 37 19.6	5 9 21.2	89 38 45.6	2 59 16.5	97 25 25.9	2 16 29.9
3.5	50 41 2.5	5 1 39.9	96 7 48.9	2 28 35.8	103 53 14.3	1 44 6.2
4.0	56 47 46.0	4 50 29.7	102 42 22.5	1 55 32.0	110 27 15.2	1 9 50.5
4.5	62 57 52.1	4 35 51.9	109 24 32.7	1 20 26.5	117 7 49.0	+ 0 34 5.3
5.0	69 11 38.8	4 17 50.0	116 8 19.3	0 43 44.9	123 55 9.2	- 0 2 42.8
5.5	75 29 20.3	3 56 29.7	122 59 34.8	+ 0 5 56.9	130 49 20.8	0 40 3.3
6.0	81 51 6.9	3 32 0.0	129 56 4.3	- 0 32 24.2	137 50 19.5	1 17 21.5
6.5	88 17 4.5	3 4 32.7	136 57 25.8	1 10 41.4	144 57 50.0	1 53 59.5
7.0	94 47 14.4	2 34 23.2	144 3 10.3	1 48 15.8	152 11 25.6	2 29 16.5
7.5	101 21 33.7	2 1 50.9	151 12 42.8	2 24 26.8	159 30 28.5	3 2 30.5
8.0	107 59 55.9	1 27 18.8	158 25 22.9	2 58 34.3	166 54 9.9	3 32 59.9
8.5	114 42 10.8	0 51 12.9	165 40 26.3	3 29 59.5	174 21 31.4	4 0 5.0
9.0	121 28 5.1	+ 0 14 3.0	172 57 6.2	3 58 6.6	181 51 26.8	4 23 10.1
9.5	128 17 22.8	- 0 23 38.8	180 14 35.3	4 22 24.2	189 22 45.1	4 41 45.3
10.0	135 9 46.2	1 1 18.0	187 32 6.9	4 42 26.1	196 54 13.3	4 55 27.6
10.5	142 4 56.3	1 38 19.1	194 48 56.7	4 57 52.2	204 24 39.5	5 4 2.4
11.0	149 2 33.2	2 14 6.4	202 4 24.3	5 8 28.6	211 52 56.3	5 7 23.2
11.5	156 2 17.1	2 48 4.3	209 17 54.1	5 14 8.1	219 18 2.9	5 5 32.2
12.0	163 3 48.0	3 19 38.9	216 28 55.5	5 14 50.1	226 39 7.7	4 58 38.9
12.5	170 6 46.4	3 48 18.5	223 37 4.2	5 10 39.1	233 55 29.4	4 46 59.5
13.0	177 10 53.6	4 13 34.3	230 42 1.3	5 1 45.4	241 6 37.8	4 30 55.5
13.5	184 15 51.4	4 35 0.8	237 43 33.6	4 48 23.9	248 12 13.2	4 10 52.3
14.0	191 21 22.3	4 52 16.9	244 41 32.7	4 30 53.0	255 12 6.4	3 47 17.8
14.5	198 27 9.3	5 5 5.7	251 35 54.4	4 9 34.2	262 6 16.7	3 20 42.1
15.0	205 32 55.9	5 13 15.2	258 26 38.2	3 44 52.0	268 54 51.0	2 51 35.3
15.5	212 38 25.7	5 16 38.0	265 13 46.0	3 17 12.5	275 38 2.0	2 20 28.0
16.0	219 43 22.1	5 15 11.7	271 57 21.6	2 47 3.3	282 16 6.9	1 47 49.8
16.5	226 47 28.3	5 8 59.1	278 37 30.2	2 14 52.9	288 49 26.1	1 14 9.7
17.0	233 50 27.2	4 58 7.9	285 14 17.3	1 41 10.3	295 18 21.3	0 39 55.3
17.5	240 52 1.2	4 42 50.3	291 47 49.2	1 6 24.7	301 43 15.2	- 0 5 33.1
18.0	247 51 52.2	4 23 23.0	298 18 11.1	- 0 31 5.0	308 4 30.0	+ 0 28 31.6
18.5	254 49 42.0	4 0 7.1	304 45 28.4	+ 0 4 20.5	314 22 27.3	1 1 55.4
19.0	261 45 12.0	3 33 27.2	311 9 45.7	0 39 24.4	320 37 27.0	1 34 16.0
19.5	268 38 3.9	3 3 50.9	317 31 7.2	1 13 40.8	326 49 47.1	2 5 12.8
20.0	275 28 0.4	2 31 48.2	323 49 36.8	1 46 45.5	332 59 43.9	2 34 26.3
20.5	282 14 44.9	1 57 51.0	330 5 18.7	2 18 15.9	339 7 31.4	3 1 39.5
21.0	288 58 2.4	1 22 31.8	336 18 17.1	2 47 51.5	345 13 21.9	3 26 36.0
21.5	295 37 39.9	0 46 23.4	342 28 37.4	3 15 14.2	351 17 26.1	3 49 1.9
22.0	302 13 27.1	- 0 9 57.9	348 36 26.0	3 40 8.4	357 19 53.7	4 8 45.0
22.5	308 45 16.6	+ 0 26 13.8	354 41 51.1	4 2 20.5	3 20 53.2	4 25 35.0
23.0	315 13 4.3	1 1 43.1	0 45 2.8	4 21 39.4	9 20 33.3	4 39 23.3
23.5	321 36 49.6	1 38 3.4	6 46 13.2	4 37 56.3	15 19 3.4	4 50 3.4
24.0	327 56 35.7	2 8 50.8	12 45 37.2	4 51 4.2	21 16 32.6	4 57 30.6
24.5	334 12 29.9	2 39 44.3	18 43 32.0	5 0 58.0	27 13 11.7	5 1 42.3
25.0	340 24 43.1	3 8 25.7	24 40 17.6	5 7 34.5	33 9 13.6	5 2 37.1
25.5	346 33 29.8	3 34 39.5	30 36 16.7	5 10 51.6	39 4 52.6	5 0 15.4
26.0	352 39 8.5	3 58 12.8	36 31 54.6	5 10 48.7	45 0 25.8	4 54 39.1
26.5	358 42 1.1	4 18 55.0	42 27 38.9	5 7 26.1	50 56 12.3	4 45 51.7
27.0	4 42 31.5	4 36 37.4	48 23 59.8	5 0 45.1	56 52 34.4	4 33 57.2
27.5	10 41 7.5	4 51 13.3	54 21 29.5	4 50 48.1	62 49 57.0	4 19 1.3
28.0	16 38 18.6	5 2 37.1	60 20 42.0	4 37 38.2	68 48 47.7	4 1 10.8
28.5	22 34 36.6	5 10 44.6	66 22 12.6	4 21 19.5	74 49 36.5	3 40 33.3
29.0	28 30 34.8	5 15 32.6	72 26 37.7	4 1 57.2	80 52 55.8	3 17 17.9
29.5	34 26 47.8	5 16 58.9	78 34 33.8	3 39 37.9	86 59 20.2	2 51 34.7
30.0	40 23 50.7	5 15 1.5	84 46 37.3	3 14 29.7	93 9 25.4	2 23 35.6
30.5	46 22 19.2	5 9 39.7	91 3 23.6	2 46 42.8	99 23 48.2	1 53 34.0
31.0	52 22 48.8	5 0 53.7	97 25 25.9	2 16 29.9	105 43 5.2	1 21 45.4
31.5	58 25 54.4	+ 4 48 44.3	103 53 14.3	+ 1 44 6.2	112 7 52.5	+ 0 48 27.7

# MOON'S LONGITUDE, &c., 1879. 243

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.		MAY.		JUNE.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	118° 36' 43.9	+ 0° 14' 1.5	164° 36' 20.4	- 2° 59' 30.3	207° 27' 22.7	- 5° 6' 1.8
1.5	125 16 9.8	- 0 21 9.4	161 38 12.7	3 27 56.1	214 55 18.3	5 4 13.3
2.0	132 0 35.7	0 56 38.0	168 47 13.0	3 53 34.9	222 25 51.7	4 55 10.6
2.5	138 52 20.1	1 31 53.9	176 3 6.7	4 15 52.1	229 57 56.8	4 40 59.6
3.0	145 51 32.4	2 6 23.4	183 25 26.8	4 34 14.1	237 30 22.4	4 21 54.7
3.5	152 58 11.2	2 39 29.7	190 53 31.5	4 48 10.5	245 1 55.3	3 58 18.6
4.0	160 12 2.9	3 10 34.0	198 26 25.5	4 57 15.6	252 31 23.3	3 30 40.8
4.5	167 32 39.9	3 38 56.3	206 3 0.7	5 1 10.4	259 57 38.5	2 59 37.6
5.0	174 59 20.4	4 3 57.5	213 41 59.0	4 59 43.8	267 19 39.8	2 25 49.0
5.5	182 31 8.6	4 25 0.8	221 21 55.4	4 52 53.8	274 36 35.0	1 49 57.7
6.0	190 6 55.9	4 41 33.8	229 1 22.0	4 40 48.7	281 47 42.6	1 12 46.6
6.5	197 45 24.2	4 53 10.4	236 38 52.1	4 23 45.1	288 52 32.0	- 0 34 57.4
7.0	205 25 8.2	4 59 32.9	244 13 4.3	4 2 8.6	295 50 43.7	+ 0 2 50.5
7.5	213 4 39.7	5 0 32.2	251 42 46.1	3 36 31.4	302 42 9.2	0 40 1.3
8.0	220 42 31.7	4 56 9.5	259 6 56.3	3 7 30.6	309 26 49.4	1 16 3.5
8.5	228 17 22.8	4 46 34.6	266 24 47.1	2 35 46.4	316 4 53.7	1 50 29.7
9.0	235 48 0.1	4 32 6.4	273 35 44.4	2 1 59.7	322 36 39.1	2 22 56.6
9.5	243 13 22.6	4 13 10.2	280 39 27.9	1 26 50.8	329 2 28.0	2 53 5.1
10.0	250 32 42.7	3 50 16.8	287 35 50.2	0 50 57.8	335 22 47.9	3 20 39.7
10.5	257 45 26.6	3 24 0.4	294 24 55.0	- 0 14 56.1	341 38 9.3	3 45 27.9
11.0	264 51 14.3	2 54 56.6	301 6 55.4	+ 0 20 42.5	347 49 5.0	4 7 19.7
11.5	271 49 58.6	2 23 41.6	307 42 12.3	0 55 30.0	353 56 9.5	4 26 7.5
12.0	278 41 43.3	1 50 50.4	314 11 12.4	1 29 1.6	359 59 57.8	4 41 45.6
12.5	285 26 41.1	1 16 56.3	320 34 26.4	2 0 56.3	6 1 4.6	4 54 9.5
13.0	292 5 12.4	0 42 30.5	326 52 27.9	2 30 55.7	12 0 4.1	5 3 16.2
13.5	298 37 42.6	- 0 8 1.8	333 5 52.0	2 58 44.3	17 57 29.5	5 9 3.6
14.0	305 4 40.9	+ 0 26 3.7	339 15 14.1	3 24 8.7	23 53 52.2	5 11 30.6
14.5	311 26 38.5	0 59 22.3	345 21 8.9	3 46 57.7	29 49 41.9	5 10 37.1
15.0	317 44 7.4	1 31 32.6	351 24 10.3	4 7 1.5	35 45 26.1	5 6 24.0
15.5	323 57 39.2	2 2 15.1	357 24 50.4	4 24 12.1	41 41 30.1	4 58 53.3
16.0	330 7 45.3	2 31 12.4	3 23 39.4	4 38 22.6	47 38 17.1	4 48 8.2
16.5	336 14 54.7	2 58 8.8	9 21 4.8	4 49 27.2	53 36 7.7	4 34 13.1
17.0	342 19 34.4	3 22 50.1	15 17 31.8	4 57 21.3	59 35 20.4	4 17 14.1
17.5	348 22 9.0	3 45 3.6	21 13 23.0	5 2 1.8	65 36 11.4	3 57 19.1
18.0	354 23 0.4	4 4 38.2	27 8 58.2	5 3 26.6	71 38 55.1	3 34 37.7
18.5	0 22 28.1	4 21 24.0	33 4 35.1	5 1 34.9	77 43 43.9	3 9 21.4
19.0	6 20 48.9	4 35 12.8	39 0 29.2	4 56 27.3	83 50 48.7	2 41 43.8
19.5	12 18 17.6	4 45 57.8	44 56 54.3	4 48 6.1	90 0 19.2	2 12 0.7
20.0	18 15 6.9	4 53 33.7	50 54 2.6	4 36 35.2	96 12 24.0	1 40 30.0
20.5	24 11 29.3	4 57 56.8	56 52 5.2	4 22 0.1	102 27 10.7	1 7 31.5
21.0	30 7 32.1	4 59 5.1	62 51 12.9	4 4 27.9	108 44 47.3	+ 0 33 27.0
21.5	36 3 28.3	4 56 58.3	68 51 36.2	3 44 7.7	115 5 21.1	- 0 1 20.0
22.0	41 59 26.7	4 51 37.7	74 53 25.5	3 21 10.4	121 29 0.2	0 36 24.4
22.5	47 55 37.7	4 43 6.3	80 56 52.0	2 55 48.5	127 55 52.5	1 11 20.0
23.0	53 52 12.9	4 31 28.7	87 2 8.1	2 28 16.2	134 26 6.5	1 45 39.3
23.5	59 49 26.3	4 16 50.9	93 9 28.0	1 58 49.4	140 59 50.8	2 18 54.5
24.0	65 47 29.7	3 59 20.7	99 19 7.3	1 27 45.6	147 37 13.9	2 50 37.2
24.5	71 46 43.0	3 39 7.0	105 31 23.2	0 55 23.7	154 18 23.8	3 20 18.8
25.0	77 47 24.8	3 16 20.3	111 46 35.1	+ 0 22 4.2	161 3 27.5	3 47 31.4
25.5	83 49 57.1	2 51 12.2	118 5 4.1	- 0 11 51.2	167 52 30.6	4 11 47.2
26.0	89 54 44.6	2 23 56.0	124 27 12.2	0 45 59.4	174 45 36.3	4 32 40.5
26.5	96 2 14.5	1 54 46.0	130 53 22.6	1 19 55.6	181 42 44.7	4 49 46.7
27.0	102 12 56.1	1 23 58.1	137 23 58.0	1 53 13.9	188 43 52.0	5 2 43.9
27.5	108 27 20.4	0 51 49.8	143 59 23.9	2 25 27.3	195 48 50.1	5 11 13.0
28.0	114 46 0.0	+ 0 18 40.3	150 39 58.8	2 56 7.6	202 57 25.4	5 14 58.8
28.5	121 9 27.4	- 0 15 9.4	157 26 2.3	3 24 45.6	210 9 18.5	5 13 50.8
29.0	127 38 15.4	0 49 16.1	164 17 48.8	3 50 51.7	217 24 3.8	5 7 43.6
29.5	134 12 55.1	1 23 14.3	171 15 27.2	4 13 55.9	224 41 10.0	4 56 37.9
30.0	140 53 54.4	1 56 36.4	178 18 59.4	4 33 29.1	231 59 59.6	4 40 40.7
30.5	147 41 37.1	2 28 52.5	185 28 19.0	4 49 3.5	239 19 50.0	4 20 6.0
31.0	154 36 20.4	2 59 30.3	192 43 9.4	5 0 13.9	246 39 54.8	3 55 14.2
31.5	161 38 12.7	- 3 27 56.1	200 3 3.4	- 5 6 38.8	253 59 24.9	- 3 26 32.0

# 244 MOON'S LONGITUDE, &c., 1879.

## FOR GRENVICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		AUGUST.		SEPTEMBER.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	246° 39' 54.8	- 3° 55' 14.2	298° 40' 34.5	+ 0° 21' 16.7	347° 1' 5.8	+ 4° 5' 58.0
1.5	253 59 24.9	3 26 32.0	305 30 37.3	0 58 42.8	353 19 57.7	4 24 47.3
2.0	261 17 30.6	2 54 31.8	312 16 47.8	1 34 56.7	359 35 31.4	4 40 13.9
2.5	268 33 22.7	2 19 50.3	318 58 51.0	2 9 28.2	5 47 50.9	4 52 12.4
3.0	275 46 14.5	1 43 7.3	325 36 35.6	2 41 50.9	11 57 3.7	5 0 4.2
3.5	282 55 23.3	1 5 4.0	332 9 54.4	3 11 42.1	18 3 20.6	5 5 37.0
4.0	290 0 11.9	- 0 26 22.1	338 38 44.9	3 38 42.8	24 6 55.5	5 7 4.8
4.5	297 0 9.4	+ 0 12 18.5	345 3 8.9	4 2 38.4	30 8 6.1	5 5 7.0
5.0	303 54 52.1	0 50 20.1	351 23 12.8	4 23 17.6	36 7 13.4	4 59 48.7
5.5	310 44 3.4	1 27 8.7	357 39 7.5	4 40 32.4	42 4 41.7	4 51 16.0
6.0	317 27 34.4	2 2 14.1	3 51 7.9	4 54 17.9	48 0 58.5	4 39 36.1
6.5	324 5 23.4	2 35 10.5	9 59 33.1	5 4 31.6	53 56 33.9	4 24 57.1
7.0	330 37 35.3	3 5 36.4	16 4 45.6	5 11 13.1	59 52 0.7	4 7 27.4
7.5	337 4 21.3	3 33 14.6	22 7 11.1	5 14 23.8	65 47 54.0	3 47 16.4
8.0	343 25 57.9	3 57 51.6	28 7 18.1	5 14 6.3	71 44 50.5	3 24 34.0
8.5	349 42 45.8	4 19 17.3	34 5 37.2	5 10 24.5	77 43 28.2	2 59 30.7
9.0	355 55 10.4	4 37 24.4	40 2 41.1	5 3 23.1	83 44 25.9	2 32 18.5
9.5	2 3 39.7	4 52 8.5	45 59 4.2	4 53 7.2	89 48 22.8	2 3 10.2
10.0	8 8 44.3	5 3 26.4	51 55 21.6	4 39 43.2	95 55 57.1	1 32 20.2
10.5	14 10 56.4	5 11 17.0	57 52 9.0	4 23 17.8	102 7 45.5	1 0 4.7
11.0	20 10 49.5	5 15 40.5	63 50 2.4	4 3 58.6	108 24 22.8	+ 0 26 42.1
11.5	26 8 57.8	5 16 37.7	69 49 37.2	3 41 54.2	114 46 20.3	- 0 7 26.9
12.0	32 5 55.6	5 14 11.0	75 51 27.9	3 17 14.3	121 14 4.9	0 41 59.0
12.5	38 2 16.8	5 8 22.7	81 56 7.5	2 50 10.1	127 47 58.4	1 16 26.3
13.0	43 58 34.7	4 59 16.7	88 4 7.0	2 20 54.5	134 28 15.0	1 50 25.6
13.5	49 55 21.3	4 46 57.3	94 15 54.7	1 49 42.5	141 15 1.4	2 23 20.1
14.0	55 53 7.2	4 31 30.0	100 31 55.6	1 16 51.3	148 8 15.4	2 54 38.1
14.5	61 52 21.4	4 13 1.4	106 52 30.8	0 42 40.8	155 7 44.4	3 23 45.1
15.0	67 53 30.5	3 51 39.3	113 17 56.9	+ 0 7 33.4	162 13 5.8	3 50 6.3
15.5	73 56 58.9	3 27 33.5	119 48 25.5	- 0 28 5.6	169 23 46.8	4 13 8.0
16.0	80 3 8.5	3 0 55.4	126 24 2.3	1 3 48.3	176 39 4.2	4 32 18.9
16.5	86 12 18.2	2 31 58.5	133 4 47.0	1 39 4.3	183 58 7.1	4 47 11.6
17.0	92 24 43.9	2 0 58.6	139 50 33.1	2 13 21.2	191 19 57.2	4 57 24.3
17.5	98 40 38.6	1 28 14.0	146 41 7.6	2 46 5.6	199 43 32.8	5 2 41.3
18.0	105 0 12.0	0 54 5.3	153 36 10.8	3 16 43.7	206 7 50.3	5 2 54.6
18.5	111 23 31.1	+ 0 18 55.9	160 35 17.6	3 44 41.9	213 31 47.6	4 58 3.7
19.0	117 50 38.9	- 0 16 49.0	167 37 58.0	4 9 28.9	220 54 26.4	4 48 15.8
19.5	124 21 36.2	0 52 41.6	174 43 33.0	4 30 35.5	228 14 54.4	4 33 44.8
20.0	130 56 30.8	1 28 12.8	181 51 40.1	4 47 36.8	235 32 27.8	4 14 50.9
20.5	137 34 48.1	2 2 52.1	189 1 26.4	5 0 12.4	242 46 30.8	3 51 59.5
21.0	144 16 50.9	2 36 8.2	196 12 18.2	5 8 7.3	249 56 37.2	3 25 39.7
21.5	151 2 20.1	3 7 30.2	203 23 38.4	5 11 12.3	257 2 29.9	2 56 22.7
22.0	157 51 5.3	3 36 27.5	210 34 52.2	5 9 24.0	264 3 59.9	2 24 41.9
22.5	164 42 54.6	4 2 31.0	217 45 28.4	5 2 45.2	271 1 4.8	1 51 10.7
23.0	171 37 34.9	4 25 13.8	224 54 59.5	4 51 24.0	277 53 48.3	1 16 22.5
23.5	178 34 51.9	4 44 11.2	232 3 2.1	4 35 34.0	284 42 18.2	0 40 50.4
24.0	185 34 30.7	4 59 2.0	239 9 17.3	4 15 33.3	291 26 45.6	- 0 5 5.6
24.5	192 36 15.9	5 9 29.0	246 13 30.2	3 51 44.0	298 7 23.1	+ 0 30 21.9
25.0	199 39 51.5	5 15 18.8	253 15 29.2	3 24 31.6	304 44 23.8	1 5 3.6
25.5	206 45 0.6	5 16 22.7	260 15 5.9	2 54 24.3	311 18 0.9	1 38 33.5
26.0	213 51 25.6	5 12 37.0	267 12 14.2	2 21 52.5	317 48 26.7	2 10 27.3
26.5	220 58 48.2	5 4 2.9	274 6 49.5	1 47 28.1	324 15 52.1	2 40 22.7
27.0	228 6 49.1	4 50 46.9	280 58 48.3	1 11 43.9	330 40 26.5	3 8 0.1
27.5	235 15 8.2	4 33 0.6	287 48 7.6	- 0 35 13.1	337 2 17.6	3 33 2.0
28.0	242 23 24.0	4 11 0.6	294 34 44.1	+ 0 1 31.5	343 21 31.5	3 55 13.7
28.5	249 31 14.3	3 45 8.6	301 18 34.2	0 37 57.7	349 33 12.6	4 14 22.6
29.0	256 38 15.9	3 15 50.4	307 59 33.8	1 13 34.8	355 52 24.5	4 30 19.0
29.5	263 44 4.7	2 43 36.0	314 37 38.0	1 47 53.7	2 4 10.5	4 42 55.6
30.0	270 48 16.0	2 8 58.5	321 12 41.4	2 20 27.8	8 13 33.6	5 52 7.8
30.5	277 50 24.8	1 32 33.3	327 44 38.4	2 50 52.8	14 20 37.6	4 57 53.3
31.0	284 50 6.6	0 54 57.4	334 13 24.1	3 18 47.7	20 25 27.3	5 0 12.3
31.5	291 46 57.4	- 0 16 48.5	340 38 54.3	+ 3 43 54.3	26 28 9.3	+ 4 59 6.8

## FOR GRENNICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		NOVEMBER.		DECEMBER.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	20° 25' 27.3	+ 5° 0' 12.3	64° 54' 0.3	+ 3° 26' 42.4	97° 35' 20.4	+ 0° 45' 6.4
1.5	26 25 9.3	4 59 6.8	70 48 37.0	3 2 50.9	103 36 28.4	+ 0 12 27.7
2.0	32 28 52.4	4 54 41.2	76 43 24.1	2 36 57.7	109 39 34.1	- 0 20 34.4
2.5	38 27 47.9	4 47 1.1	82 38 43.6	2 9 17.6	115 45 0.0	0 53 37.0
3.0	44 25 9.9	4 36 13.9	88 35 0.6	1 40 6.0	121 53 10.5	1 26 18.9
3.5	50 21 15.2	4 22 28.2	94 32 43.1	1 9 39.1	128 4 31.7	1 58 18.3
4.0	56 16 24.3	4 5 53.5	100 32 21.6	0 38 13.7	134 19 31.1	2 29 12.8
4.5	62 11 0.9	3 46 40.2	106 34 29.1	+ 0 6 7.7	140 38 36.9	2 58 39.4
5.0	68 5 31.6	3 24 59.7	112 39 40.8	- 0 26 20.6	147 2 17.4	3 26 14.3
5.5	74 0 26.2	3 1 3.7	118 48 33.4	0 58 51.5	153 31 0.4	3 51 33.4
6.0	79 56 17.5	2 35 4.9	125 1 44.7	1 31 4.1	160 5 12.3	4 14 12.2
6.5	85 53 40.7	2 7 16.6	131 19 52.3	2 2 36.2	166 45 16.4	4 33 45.9
7.0	91 53 13.3	1 37 52.8	137 43 32.9	2 33 4.2	173 31 32.1	4 49 50.2
7.5	97 55 34.5	1 7 8.4	144 13 21.1	3 2 2.8	180 24 13.6	5 2 1.5
8.0	104 1 24.5	0 35 19.7	150 49 47.9	3 29 5.0	187 23 27.5	5 9 57.5
8.5	110 11 24.0	+ 0 2 44.6	157 33 18.9	3 53 42.9	194 29 12.1	5 13 18.8
9.0	116 26 13.0	- 0 30 17.3	164 24 12.7	4 15 27.2	201 41 15.6	5 11 49.2
9.5	122 46 29.8	1 3 24.9	171 22 39.0	4 33 48.6	208 59 15.3	5 5 17.5
10.0	129 12 50.0	1 36 14.6	178 28 36.3	4 48 18.1	216 22 36.6	4 53 38.5
10.5	135 45 45.0	2 8 20.2	185 41 51.0	4 58 28.5	223 50 33.8	4 36 54.5
11.0	142 25 40.2	2 39 13.6	193 1 55.5	5 3 56.5	231 22 10.4	4 15 15.9
11.5	149 12 53.3	3 8 24.2	200 28 8.3	5 4 22.9	238 56 21.2	3 49 1.7
12.0	156 7 33.5	3 35 19.9	207 59 34.1	4 59 35.5	246 31 54.2	3 18 39.3
12.5	163 9 38.1	3 59 27.5	215 35 5.6	4 49 30.1	254 7 34.0	2 44 44.0
13.0	170 18 52.5	4 20 13.8	223 13 25.3	4 34 11.2	261 42 4.6	2 7 57.7
13.5	177 34 48.6	4 37 7.0	230 53 9.6	4 13 53.2	269 14 12.7	1 29 6.3
14.0	184 56 44.8	4 49 38.5	238 32 51.8	3 48 59.7	276 42 50.4	0 48 58.4
14.5	192 23 47.2	4 57 24.0	246 11 6.7	3 20 2.3	284 6 57.3	- 0 8 22.8
15.0	199 54 49.7	5 0 5.9	253 46 34.0	2 47 39.7	291 25 43.1	+ 0 31 53.6
15.5	207 28 38.3	4 57 33.9	261 18 1.9	2 12 35.2	298 38 27.9	1 11 7.8
16.0	215 3 52.7	4 49 47.1	268 44 29.4	1 35 34.6	305 44 43.3	1 48 41.2
16.5	222 39 11.4	4 36 52.9	276 5 8.1	0 57 23.7	312 44 11.8	2 24 1.2
17.0	230 13 14.5	4 19 7.9	283 19 23.0	- 0 18 47.2	319 36 46.8	2 56 40.8
17.5	237 44 47.7	3 56 56.6	290 26 52.0	+ 0 19 33.6	326 22 30.8	3 26 18.8
18.0	245 12 45.6	3 30 49.8	297 27 25.1	0 57 1.2	333 1 34.8	3 52 39.2
18.5	252 36 13.7	3 1 23.0	304 21 3.2	1 33 3.1	339 34 16.3	4 15 30.9
19.0	259 54 29.6	2 29 15.0	311 7 56.4	2 7 11.4	346 0 58.6	4 34 46.3
19.5	267 7 3.7	1 55 5.4	317 48 21.8	2 39 2.5	352 22 9.0	4 50 21.7
20.0	274 13 38.6	1 19 33.8	324 22 42.0	3 8 17.5	358 38 17.6	5 2 15.3
20.5	281 14 7.8	0 43 18.0	330 51 23.6	3 34 41.2	4 49 56.6	5 10 28.2
21.0	288 8 34.4	- 0 6 53.6	337 14 55.1	3 58 1.5	10 57 39.2	5 15 2.7
21.5	294 57 8.9	+ 0 29 6.6	343 33 46.8	4 18 9.3	17 1 58.5	5 16 2.3
22.0	301 40 7.9	1 4 13.3	349 48 28.6	4 34 58.0	23 3 27.6	5 13 32.0
22.5	308 17 51.9	1 37 59.8	355 59 30.3	4 48 23.0	29 2 38.8	5 7 37.4
23.0	314 50 43.7	2 10 2.7	2 7 20.2	4 58 21.5	30 0 2.9	4 58 25.1
23.5	321 19 7.4	2 40 1.4	8 12 25.2	5 4 52.3	40 56 9.1	4 46 2.5
24.0	327 43 27.1	3 7 38.1	14 15 10.5	5 7 55.6	46 51 25.2	4 30 37.8
24.5	334 4 6.4	3 32 37.5	20 15 59.1	5 7 33.1	52 46 17.1	4 12 20.6
25.0	340 21 27.4	3 54 46.7	26 15 11.8	5 3 47.9	58 41 8.4	3 51 21.1
25.5	346 35 50.2	4 13 54.9	32 13 7.8	4 56 44.4	64 36 20.9	3 27 50.9
26.0	352 47 33.1	4 29 53.5	38 10 4.3	4 46 28.3	70 32 14.4	3 9 3.0
26.5	358 56 52.2	4 42 35.8	44 6 16.9	4 33 7.0	76 29 7.0	2 34 11.5
27.0	5 4 1.7	4 51 57.1	50 1 59.5	4 16 48.8	82 27 14.8	2 4 32.2
27.5	11 9 13.9	4 57 54.9	55 57 25.1	3 57 44.0	88 26 52.6	1 33 22.2
28.0	17 12 39.2	5 0 28.3	61 52 46.5	3 36 4.0	94 28 13.8	1 0 59.9
28.5	23 14 26.9	4 59 38.5	67 48 15.8	3 12 1.5	100 31 30.8	+ 0 27 45.2
29.0	29 14 45.6	4 55 28.4	73 44 5.2	2 45 50.6	106 36 55.2	- 0 6 0.8
29.5	35 13 43.6	4 48 2.9	79 40 27.9	2 17 46.9	112 44 38.3	0 39 56.0
30.0	41 11 29.5	4 37 28.3	85 37 37.8	1 48 6.8	118 54 51.0	1 13 37.4
30.5	47 8 12.7	4 23 52.8	91 35 49.7	1 17 7.8	125 7 44.2	1 46 41.4
31.0	53 4 3.7	4 7 25.9	97 35 20.4	0 45 8.4	131 23 29.2	2 18 43.9
31.5	58 59 14.8	+ 3 48 18.4	103 36 28.4	+ 0 12 27.7	137 42 17.7	- 2 49 20.7





**ASTRONOMICAL EPHEMERIS**

**FOR THE**

**MERIDIAN OF WASHINGTON.**

# 248 OBLIQUITY OF THE ECLIPTIC, &c.

Mean Noon.	Apparent Obliquity.	Equation of Equinoxes.		Precession of Equinoxes in Longitude.	The Sun's		Mean Longitude of Moon's Ascending Node.
		In Longitude.	In R. A.		Aberration.	Hor. Parallax.	
1879.	23° 27'						
Jan. 0	22.36	+14.32	+0.875	0.00	-20.80	9.00	305 19.9
10	22.38	14.82	0.907	1.38	20.79	9.00	304 48.1
20	22.45	15.22	0.932	2.75	20.77	8.99	304 16.3
30	22.55	15.49	0.948	4.13	20.74	8.98	303 44.5
Feb 9	22.66	15.60	0.954	5.50	20.71	8.96	303 12.7
19	22.76	15.53	0.950	6.88	-20.67	8.94	302 41.0
Mar. 1	22.82	15.35	0.938	8.26	20.63	8.92	302 9.2
11	22.83	15.06	0.920	9.63	20.57	8.90	301 37.4
21	22.77	14.72	0.899	11.01	20.51	8.87	301 5.7
31	22.66	14.36	0.878	12.38	20.45	8.85	300 33.9
Apr. 10	22.49	14.06	0.860	13.76	-20.39	8.82	300 2.1
20	22.25	13.86	0.848	15.14	20.34	8.80	299 30.3
30	21.99	13.79	0.843	16.51	20.29	8.78	298 58.6
May 10	21.72	13.86	0.846	17.89	20.24	8.76	298 26.8
20	21.46	14.05	0.858	19.26	20.19	8.74	297 55.0
30	21.23	14.36	0.878	20.64	-20.16	8.72	297 23.3
June 9	21.05	14.76	0.903	22.02	20.13	8.71	296 51.5
19	20.92	15.22	0.931	23.39	20.11	8.71	296 19.7
29	20.85	15.69	0.960	24.77	20.11	8.70	295 47.9
July 9	20.83	16.12	0.987	26.14	20.10	8.70	295 16.2
19	20.86	16.47	1.008	27.52	-20.12	8.71	294 44.4
29	20.93	16.71	1.021	28.90	20.14	8.72	294 12.6
Aug. 8	21.03	16.81	1.027	30.27	20.17	8.73	293 40.8
18	21.13	16.78	1.026	31.65	20.20	8.75	293 9.1
28	21.20	16.62	1.017	33.02	20.24	8.77	292 37.3
Sept. 7	21.22	16.34	1.000	34.40	-20.29	8.79	292 5.5
17	21.19	15.99	0.978	35.78	20.35	8.81	291 33.7
27	21.10	15.61	0.955	37.15	20.41	8.84	291 2.0
Oct. 7	20.95	15.26	0.934	38.53	20.47	8.87	290 30.2
17	20.74	14.98	0.917	39.90	20.53	8.88	289 58.4
27	20.49	14.82	0.906	41.28	-20.59	8.91	289 26.7
Nov. 6	20.21	14.80	0.904	42.66	20.64	8.93	288 54.9
16	19.93	14.93	0.912	44.03	20.69	8.95	288 23.1
26	19.66	15.21	0.929	45.41	20.73	8.97	287 51.4
Dec. 6	19.44	15.62	0.954	46.78	-20.76	8.98	287 19.6
16	19.27	16.11	0.984	48.16	20.78	8.99	286 47.8
26	19.19	16.64	1.016	49.54	20.79	9.00	286 16.0
36	19.15	+17.13	+1.047	50.91	-20.79	9.00	285 44.3
Mean Obliquity, 1879.0, 23° 27' 17".53      Motion in 100 days, -0".1272 Precession for 1879.5, . . . 50".2592      Log. 1.70122 Precession in a Solar Day, . . . 0".1376      Log. 9.13863 Precession in a Sidereal Day, . . . 0".1372      Log. 9.13744 Sun's Mean Hor. Parallax, . . . 8".848							Daily Motion.  -3'.177

## FOR WASHINGTON MEAN MIDNIGHT.

### LOGARITHMS FOR REDUCTION OF MEAN PLACES, 1878.0, TO APPARENT PLACES.

Solar day. Sid. hour.	Log. A.	Log. B.	Log. C.	Log. D.	Solar day. Sid. hour.	Log. A.	Log. B.	Log. C.	Log. D.
Jan. 0	9.4565	$\pi 0.6844$	$\pi 0.5327$	1.3033	Mar. 1	9.6719	$\pi 0.7304$	$\pi 1.2495$	0.8170
1	9.4622	0.6845	0.5724	1.3018	2	9.6740	0.7308	1.2520	0.7939
2	9.4678	0.6846	0.6088	1.3001	3	9.6760	0.7311	1.2544	0.7694
3	9.4734	0.6847	0.6422	1.2983	4	9.6780	0.7314	1.2566	0.7433
h 4	9.4788	0.6849	0.6731	1.2964	5	9.6800	0.7316	1.2586	0.7154
(7.0) 5	9.4842	0.6852	0.7018	1.2943	h 6	9.6820	$\pi 0.7318$	$\pi 1.2606$	0.6854
6	9.4896	$\pi 0.6855$	$\pi 0.7286$	1.2921	(11.0) 7	9.6839	0.7319	1.2623	0.6531
7	9.4947	0.6858	0.7538	1.2897	8	9.6858	0.7320	1.2640	0.6182
8	9.4998	0.6863	0.7774	1.2872	9	9.6877	0.7320	1.2655	0.5799
9	9.5048	0.6867	0.7997	1.2845	10	9.6896	0.7320	1.2668	0.5380
10	9.5097	0.6873	0.8207	1.2817	11	9.6914	$\pi 0.7320$	$\pi 1.2681$	0.4913
11	9.5146	$\pi 0.6879$	$\pi 0.8407$	1.2787	12	9.6933	0.7318	1.2692	0.4389
12	9.5193	0.6885	0.8596	1.2755	13	9.6951	0.7316	1.2701	0.3792
13	9.5240	0.6891	0.8776	1.2723	14	9.6969	0.7314	1.2709	0.3100
14	9.5286	0.6898	0.8948	1.2688	15	9.6987	0.7311	1.2716	0.2270
15	9.5332	0.6905	0.9112	1.2652	16	9.7005	$\pi 0.7308$	$\pi 1.2722$	0.1248
16	9.5376	$\pi 0.6913$	$\pi 0.9268$	1.2613	17	9.7023	0.7304	1.2726	9.9909
17	9.5420	0.6921	0.9418	1.2573	18	9.7040	0.7300	1.2729	9.7956
18	9.5463	0.6929	0.9561	1.2532	19	9.7058	0.7295	1.2731	$\pi 9.4316$
h 19	9.5505	0.6938	0.9698	1.2489	20	9.7075	0.7289	1.2731	$\pi 8.9026$
(8.0) 20	9.5546	0.6947	0.9830	1.2444	h 21	9.7093	$\pi 0.7284$	$\pi 1.2730$	$\pi 8.6406$
21	9.5587	$\pi 0.6956$	$\pi 0.9957$	1.2397	(12.0) 22	9.7110	0.7277	1.2728	9.8980
22	9.5627	0.6966	1.0078	1.2348	23	9.7127	0.7270	1.2724	0.0583
23	9.5666	0.6975	1.0195	1.2297	24	9.7144	0.7262	1.2719	0.1750
24	9.5705	0.6985	1.0308	1.2244	25	9.7161	0.7254	1.2713	0.2667
25	9.5743	0.6995	1.0416	1.2189	26	9.7178	$\pi 0.7245$	$\pi 1.2706$	$\pi 0.3423$
26	9.5780	$\pi 0.7005$	$\pi 1.0520$	1.2132	27	9.7195	0.7236	1.2697	0.4064
27	9.5817	0.7016	1.0621	1.2073	28	9.7213	0.7226	1.2687	0.4622
28	9.5853	0.7026	1.0718	1.2012	29	9.7230	0.7216	1.2676	0.5115
29	9.5888	0.7037	1.0811	1.1949	30	9.7247	0.7205	1.2663	0.5556
30	9.5922	0.7048	1.0901	1.1883	31	9.7264	0.7194	1.2649	0.5955
31	9.5956	0.7058	1.0988	1.1815	Apr. 1	9.7281	$\pi 0.7182$	$\pi 1.2634$	$\pi 0.6318$
Feb. 1	9.5989	$\pi 0.7069$	$\pi 1.1072$	1.1745	2	9.7298	0.7169	1.2617	0.6652
2	9.6022	0.7080	1.1153	1.1672	3	9.7316	0.7156	1.2599	0.6962
h 3	9.6054	0.7091	1.1231	1.1596	4	9.7333	0.7143	1.2580	0.7249
(9.0) 4	9.6086	0.7101	1.1306	1.1518	5	9.7350	0.7129	1.2559	0.7517
5	9.6117	0.7112	1.1379	1.1436	h 6	9.7368	$\pi 0.7114$	$\pi 1.2537$	$\pi 0.7769$
6	9.6147	$\pi 0.7122$	$\pi 1.1449$	1.1352	(13.0) 7	9.7385	0.7099	1.2514	0.8005
7	9.6177	0.7133	1.1516	1.1265	8	9.7403	0.7084	1.2489	0.8226
8	9.6206	0.7143	1.1582	1.1175	9	9.7420	0.7068	1.2462	0.8438
9	9.6235	0.7154	1.1645	1.1082	10	9.7438	0.7051	1.2435	0.8638
10	9.6263	0.7164	1.1705	1.0985	11	9.7455	$\pi 0.7034$	$\pi 1.2405$	$\pi 0.8827$
11	9.6291	$\pi 0.7174$	$\pi 1.1764$	1.0884	12	9.7473	0.7017	1.2375	0.9007
12	9.6318	0.7184	1.1820	1.0780	13	9.7491	0.6999	1.2343	0.9179
13	9.6345	0.7193	1.1874	1.0672	14	9.7509	0.6981	1.2309	0.9343
14	9.6372	0.7202	1.1926	1.0560	15	9.7527	0.6962	1.2274	0.9500
15	9.6398	0.7211	1.1977	1.0443	16	9.7546	$\pi 0.6943$	$\pi 1.2237$	$\pi 0.9649$
16	9.6423	$\pi 0.7220$	$\pi 1.2025$	1.0322	17	9.7564	0.6923	1.2199	0.9792
17	9.6448	0.7229	1.2072	1.0197	18	9.7582	0.6903	1.2159	0.9930
18	9.6473	0.7237	1.2116	1.0066	19	9.7601	0.6883	1.2118	1.0062
h 19	9.6497	0.7245	1.2159	0.9929	20	9.7619	0.6862	1.2075	1.0189
(10.0) 20	9.6521	0.7253	1.2200	0.9788	h 21	9.7638	$\pi 0.6841$	$\pi 1.2030$	$\pi 1.0311$
21	9.6544	$\pi 0.7260$	$\pi 1.2239$	0.9640	(14.0) 22	9.7656	0.6820	1.1984	1.0428
22	9.6567	0.7267	1.2277	0.9485	23	9.7675	0.6798	1.1936	1.0541
23	9.6590	0.7273	1.2313	0.9323	24	9.7694	0.6776	1.1886	1.0650
24	9.6612	0.7279	1.2347	0.9154	25	9.7713	0.6753	1.1834	1.0755
25	9.6634	0.7285	1.2380	0.8977	26	9.7733	$\pi 0.6730$	$\pi 1.1780$	$\pi 1.0856$
26	9.6656	$\pi 0.7290$	$\pi 1.2411$	0.8791	27	9.7752	0.6707	1.1725	1.0954
27	9.6678	0.7295	1.2441	0.8595	28	9.7771	0.6684	1.1667	1.1048
28	9.6699	0.7300	1.2469	0.8388	29	9.7791	0.6660	1.1608	1.1138
29	9.6719	0.7304	1.2495	0.8170	30	9.7810	$\pi 0.6636$	$\pi 1.1546$	$\pi 1.1226$
30	9.6740	$\pi 0.7308$	$\pi 1.2520$	0.7939					

## FOR WASHINGTON MEAN MIDNIGHT.

## LOGARITHMS FOR REDUCTION OF MEAN PLACES, 1878.0, TO APPARENT PLACES.

Solar day. Sid. hour.	Log. A.	Log. B.	Log. C.	Log. D.	Solar day. Sid. hour.	Log. A.	Log. B.	Log. C.	Log. D.
<b>May</b> 1	9.7830	$\pi$ 0.6612	$\pi$ 1.1482	$\pi$ 1.1311	<b>July</b> 1	9.9103	$\pi$ 0.5497	0.5087	$\pi$ 1.3041
2	9.7850	0.6588	1.1416	1.1393	2	9.9122	0.5495	0.5481	1.3028
3	9.7870	0.6563	1.1348	1.1472	3	9.9141	0.5494	0.5842	1.3013
4	9.7890	0.6539	1.1277	1.1548	4	9.9160	0.5494	0.6174	1.2997
5	9.7910	0.6514	1.1204	1.1622	5	9.9179	0.5494	0.6481	1.2980
<sup>h</sup> 6	9.7930	$\pi$ 0.6489	$\pi$ 1.1129	$\pi$ 1.1693	<sup>h</sup> 6	9.9198	$\pi$ 0.5495	0.6766	$\pi$ 1.2963
(15.0) 7	9.7950	0.6464	1.1051	1.1762	(15.0) 7	9.9216	0.5496	0.7033	1.2949
8	9.7971	0.6439	1.0971	1.1829	8	9.9234	0.5499	0.7284	1.2932
9	9.7991	0.6414	1.0887	1.1893	9	9.9253	0.5501	0.7520	1.2919
10	9.8012	0.6389	1.0801	1.1955	10	9.9271	0.5505	0.7742	1.2876
11	9.8033	$\pi$ 0.6363	$\pi$ 1.0712	$\pi$ 1.2015	11	9.9289	$\pi$ 0.5509	0.7953	$\pi$ 1.2851
12	9.8053	0.6338	1.0620	1.2073	12	9.9306	0.5514	0.8152	1.2835
13	9.8074	0.6312	1.0525	1.2129	13	9.9324	0.5519	0.8341	1.2797
14	9.8095	0.6287	1.0426	1.2183	14	9.9341	0.5525	0.8523	1.2768
15	9.8116	0.6262	1.0324	1.2235	15	9.9358	0.5531	0.8696	1.2738
16	9.8137	$\pi$ 0.6237	$\pi$ 1.0218	$\pi$ 1.2286	16	9.9375	$\pi$ 0.5537	0.8859	$\pi$ 1.2706
17	9.8159	0.6212	1.0108	1.2334	17	9.9392	0.5544	0.9017	1.2673
18	9.8180	0.6187	0.9995	1.2382	18	9.9409	0.5551	0.9168	1.2638
19	9.8201	0.6162	0.9877	1.2427	19	9.9425	0.5559	0.9312	1.2602
20	9.8222	0.6137	0.9754	1.2470	20	9.9442	0.5568	0.9451	1.2564
<sup>h</sup> 21	9.8244	$\pi$ 0.6112	$\pi$ 0.9626	$\pi$ 1.2512	<sup>h</sup> 21	9.9458	$\pi$ 0.5577	0.9584	$\pi$ 1.2525
(15.0) 22	9.8265	0.6088	0.9494	1.2552	(20.0) 22	9.9474	0.5586	0.9712	1.2484
23	9.8286	0.6064	0.9356	1.2590	23	9.9490	0.5596	0.9836	1.2442
24	9.8308	0.6040	0.9212	1.2627	24	9.9505	0.5606	0.9955	1.2398
25	9.8329	0.6017	0.9062	1.2663	25	9.9521	0.5616	1.0069	1.2352
26	9.8351	$\pi$ 0.5994	$\pi$ 0.8906	$\pi$ 1.2697	26	9.9536	$\pi$ 0.5626	1.0180	$\pi$ 1.2304
27	9.8372	0.5971	0.8743	1.2729	27	9.9551	0.5637	1.0286	1.2255
28	9.8394	0.5948	0.8572	1.2760	28	9.9566	0.5648	1.0389	1.2204
29	9.8416	0.5926	0.8393	1.2790	29	9.9581	0.5659	1.0488	1.2151
30	9.8437	0.5904	0.8205	1.2818	30	9.9596	0.5670	1.0584	1.2096
31	9.8459	0.5882	0.8008	1.2844	31	9.9610	0.5682	1.0676	1.2039
<b>June</b> 1	9.8480	$\pi$ 0.5861	$\pi$ 0.7800	$\pi$ 1.2869	<b>Aug.</b> 1	9.9625	$\pi$ 0.5694	1.0766	$\pi$ 1.1990
2	9.8502	0.5840	0.7579	1.2893	2	9.9639	0.5706	1.0852	1.1919
3	9.8523	0.5820	0.7346	1.2916	3	9.9652	0.5717	1.0936	1.1856
4	9.8545	0.5800	0.7100	1.2937	4	9.9666	0.5729	1.1017	1.1791
<sup>h</sup> 5	9.8566	0.5781	0.6836	1.2957	<sup>h</sup> 5	9.9680	0.5741	1.1096	1.1724
(17.0) 6	9.8588	$\pi$ 0.5762	$\pi$ 0.6554	$\pi$ 1.2976	(21.0) 6	9.9693	$\pi$ 0.5753	1.1171	$\pi$ 1.1654
7	9.8609	0.5744	0.6252	1.2993	7	9.9707	0.5765	1.1245	1.1582
8	9.8631	0.5726	0.5925	1.3009	8	9.9720	0.5777	1.1316	1.1507
9	9.8652	0.5709	0.5571	1.3024	9	9.9733	0.5789	1.1384	1.1430
10	9.8674	0.5692	0.5184	1.3037	10	9.9745	0.5801	1.1450	1.1350
11	9.8695	$\pi$ 0.5676	$\pi$ 0.4758	$\pi$ 1.3050	11	9.9758	$\pi$ 0.5813	1.1514	$\pi$ 1.1268
12	9.8716	0.5661	0.4284	1.3061	12	9.9770	0.5825	1.1577	1.1182
13	9.8737	0.5646	0.3751	1.3071	13	9.9783	0.5836	1.1637	1.1094
14	9.8758	0.5632	0.3142	1.3079	14	9.9795	0.5848	1.1695	1.1002
15	9.8779	0.5619	0.2432	1.3087	15	9.9807	0.5859	1.1751	1.0907
16	9.8800	$\pi$ 0.5606	$\pi$ 0.1581	$\pi$ 1.3093	16	9.9819	$\pi$ 0.5870	1.1805	$\pi$ 1.0809
17	9.8821	0.5594	0.0523	1.3098	17	9.9830	0.5881	1.1857	1.0708
18	9.8842	0.5582	0.9116	1.3102	18	9.9841	0.5891	1.1907	1.0602
19	9.8863	0.5571	9.7023	1.3104	19	9.9853	0.5901	1.1956	1.0493
<sup>h</sup> 20	9.8884	0.5561	$\pi$ 9.2815	1.3106	<sup>h</sup> 20	9.9864	0.5911	1.2003	1.0379
(15.0) 21	9.8904	$\pi$ 0.5552	$\pi$ 8.0777	$\pi$ 1.3106	(22.0) 21	9.9875	$\pi$ 0.5921	1.2048	$\pi$ 1.0262
22	9.8925	0.5543	9.6358	1.3105	22	9.9886	0.5930	1.2092	1.0139
23	9.8945	0.5535	9.8719	1.3102	23	9.9897	0.5939	1.2134	1.0012
24	9.8965	0.5528	0.0238	1.3099	24	9.9907	0.5947	1.2174	0.9879
25	9.8985	0.5521	0.1361	1.3094	25	9.9918	0.5956	1.2213	0.9741
26	9.9005	$\pi$ 0.5515	0.2251	$\pi$ 1.3088	26	9.9928	$\pi$ 0.5964	1.2250	0.9596
27	9.9025	0.5510	0.2938	1.3081	27	9.9938	0.5971	1.2286	0.9446
28	9.9045	0.5506	0.3617	1.3073	28	9.9949	0.5978	1.2320	0.9289
29	9.9064	0.5502	0.4165	1.3063	29	9.9959	0.5985	1.2353	0.9125
30	9.9084	0.5499	0.4651	1.3053	30	9.9969	0.5991	1.2384	0.8952
31	9.9103	$\pi$ 0.5497	0.5087	$\pi$ 1.3041	31	9.9978	$\pi$ 0.5997	1.2414	$\pi$ 0.8772

## FOR WASHINGTON MEAN MIDNIGHT.

## LOGARITHMS FOR REDUCTION OF MEAN PLACES, 1878.0, TO APPARENT PLACES.

Solar day. Sid. hour.	Log. A.	Log. B.	Log. C.	Log. D.	Solar day. Sid. hour.	Log. A.	Log. B.	Log. C.	Log. D.
Sept. 1	9.9988	$\pi$ 0.6002	1.2442	$\pi$ 0.8581	Nov. 1	0.0532	$\pi$ 0.5058	1.1610	1.1134
2	9.9998	0.6006	1.2470	0.8382	2	0.0542	0.5021	1.1546	1.1225
3	0.0007	0.6010	1.2495	0.8171	3	0.0553	0.4984	1.1480	1.1313
4	0.0017	0.6014	1.2519	0.7948	4	0.0563	0.4946	1.1412	1.1398
(3.0) 5	0.0026	0.6017	1.2542	0.7710	(3.0) 5	0.0574	0.4908	1.1341	1.1480
6	0.0035	$\pi$ 0.6020	1.2564	$\pi$ 0.7459	6	0.0585	$\pi$ 0.4870	1.1268	1.1559
7	0.0044	0.6022	1.2584	0.7190	7	0.0595	0.4831	1.1192	1.1635
8	0.0053	0.6023	1.2603	0.6901	8	0.0606	0.4791	1.1113	1.1709
9	0.0062	0.6024	1.2620	0.6592	9	0.0618	0.4751	1.1031	1.1780
10	0.0071	0.6024	1.2637	0.6257	10	0.0629	0.4711	1.0947	1.1848
11	0.0080	$\pi$ 0.6023	1.2652	$\pi$ 0.5891	11	0.0640	$\pi$ 0.4671	1.0859	1.1915
12	0.0089	0.6022	1.2665	0.5490	12	0.0651	0.4631	1.0768	1.1979
13	0.0097	0.6021	1.2677	0.5049	13	0.0663	0.4591	1.0674	1.2041
14	0.0106	0.6018	1.2689	0.4555	14	0.0674	0.4550	1.0576	1.2100
15	0.0115	0.6015	1.2698	0.3997	15	0.0686	0.4509	1.0475	1.2158
16	0.0123	$\pi$ 0.6011	1.2707	$\pi$ 0.3353	16	0.0697	$\pi$ 0.4468	1.0369	1.2214
17	0.0132	0.6007	1.2714	0.2594	17	0.0709	0.4426	1.0260	1.2267
18	0.0140	0.6002	1.2720	0.1673	18	0.0721	0.4385	1.0147	1.2319
19	0.0148	0.5997	1.2725	0.0496	19	0.0733	0.4344	1.0029	1.2368
20	0.0157	0.5990	1.2728	9.8880	20	0.0745	0.4303	0.9906	1.2416
(0.0) 21	0.0165	$\pi$ 0.5983	1.2730	$\pi$ 9.6965	(4.0) 21	0.0757	$\pi$ 0.4262	0.9778	1.2462
22	0.0174	0.5975	1.2731	$\pi$ 8.8560	22	0.0769	0.4221	0.9644	1.2506
23	0.0182	0.5966	1.2731	$\pi$ 9.4391	23	0.0781	0.4180	0.9506	1.2549
24	0.0190	0.5957	1.2729	9.7960	24	0.0793	0.4140	0.9361	1.2589
25	0.0199	0.5947	1.2726	9.9890	25	0.0806	0.4100	0.9210	1.2628
26	0.0207	$\pi$ 0.5936	1.2722	0.1222	26	0.0818	$\pi$ 0.4059	0.9051	1.2666
27	0.0215	0.5925	1.2716	0.2238	27	0.0830	0.4019	0.8886	1.2701
28	0.0223	0.5913	1.2710	0.3062	28	0.0843	0.3980	0.8712	1.2735
29	0.0232	0.5900	1.2702	0.3752	29	0.0855	0.3941	0.8530	1.2767
30	0.0240	0.5886	1.2692	0.4347	30	0.0868	0.3903	0.8338	1.2798
Oct. 1	0.0248	$\pi$ 0.5871	1.2682	0.4870	Dec. 1	0.0880	$\pi$ 0.3865	0.8136	1.2827
2	0.0257	0.5856	1.2670	0.5336	2	0.0893	0.3828	0.7922	1.2855
3	0.0265	0.5840	1.2656	0.5754	3	0.0906	0.3792	0.7696	1.2881
4	0.0273	0.5823	1.2642	0.6136	4	0.0918	0.3756	0.7456	1.2906
5	0.0282	0.5806	1.2626	0.6485	5	0.0931	0.3721	0.7200	1.2930
(1.0) 6	0.0290	$\pi$ 0.5787	1.2608	0.6808	(5.0) 6	0.0944	$\pi$ 0.3686	0.6927	1.2951
7	0.0299	0.5768	1.2589	0.7107	7	0.0957	0.3653	0.6633	1.2971
8	0.0307	0.5749	1.2569	0.7388	8	0.0970	0.3620	0.6317	1.2990
9	0.0316	0.5728	1.2548	0.7647	9	0.0982	0.3580	0.5975	1.3007
10	0.0324	0.5706	1.2525	0.7892	10	0.0995	0.3558	0.5602	1.3023
11	0.0333	$\pi$ 0.5684	1.2501	0.8124	11	0.1008	$\pi$ 0.3529	0.5192	1.3038
12	0.0342	0.5669	1.2475	0.8341	12	0.1021	0.3500	0.4738	1.3051
13	0.0351	0.5638	1.2448	0.8548	13	0.1034	0.3473	0.4229	1.3062
14	0.0359	0.5614	1.2419	0.8743	14	0.1047	0.3446	0.3650	1.3073
15	0.0368	0.5589	1.2388	0.8929	15	0.1059	0.3421	0.2980	1.3082
16	0.0377	$\pi$ 0.5563	1.2356	0.9106	16	0.1072	$\pi$ 0.3396	0.2186	1.3089
17	0.0386	0.5537	1.2323	0.9276	17	0.1085	0.3374	0.1212	1.3095
18	0.0395	0.5509	1.2288	0.9438	18	0.1097	0.3352	9.9953	1.3100
19	0.0405	0.5481	1.2251	0.9593	19	0.1110	0.3332	9.8170	1.3103
20	0.0414	0.5452	1.2213	0.9742	20	0.1123	0.3314	$\pi$ 9.5090	1.3105
(0.0) 21	0.0423	$\pi$ 0.5423	1.2173	0.9884	(0.0) 21	0.1135	$\pi$ 0.3296	$\pi$ 7.9930	1.3106
22	0.0432	0.5393	1.2131	1.0021	22	0.1148	0.3280	9.5433	1.3105
23	0.0442	0.5362	1.2088	1.0152	23	0.1161	0.3265	9.8307	1.3103
24	0.0452	0.5331	1.2042	1.0278	24	0.1174	0.3252	0.0045	1.3100
25	0.0461	0.5299	1.1995	1.0399	25	0.1186	0.3240	0.1982	1.3095
26	0.0471	0.5266	1.1946	1.0516	26	0.1199	0.3229	0.2942	1.3088
27	0.0481	$\pi$ 0.5233	1.1896	1.0639	27	0.1212	$\pi$ 0.3220	$\pi$ 0.3028	1.3081
28	0.0491	0.5199	1.1842	1.0737	28	0.1224	0.3212	0.3691	1.3072
29	0.0501	0.5164	1.1787	1.0841	29	0.1236	0.3206	0.4266	1.3061
30	0.0511	0.5129	1.1730	1.0943	30	0.1248	0.3201	0.4771	1.3049
31	0.0521	0.5094	1.1671	1.1040	31	0.1260	0.3197	0.5223	1.3036
32	0.0532	$\pi$ 0.5058	1.1610	1.1134	32	0.1272	$\pi$ 0.3196	$\pi$ 0.5631	1.3022



**REV.**

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## FOR WASHINGTON MEAN MIDNIGHT.

## QUANTITIES FOR REDUCING MEAN PLACES, 1879.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$ .	$f$ .	Log $g$ .	$G$ .	Log $h$ .	$H$ .	Log $i$ .	$i$ .	$f$ .	$G$ .	$H$ .
May 1	0.3326	+28.00	1.1140	339° 21'	1.2903	226° 7'	m0.7858	-6.11	+1.867	22 37.4	15 4.5
2	.3354	28.12	.1155	339 33	.2909	225 9	.7793	6.02	1.875	38.2	15 0.6
3	.3381	28.25	.1169	339 44	.2916	224 11	.7725	5.92	1.883	38.9	14 56.7
4	.3408	28.38	.1184	339 55	.2922	223 13	.7655	5.83	1.892	39.7	14 52.9
5	.3436	28.51	.1199	340 7	.2928	222 15	.7581	5.73	1.901	40.5	14 49.0
h (15.0) 6	.3463	+28.65	1.1214	340 18	1.2935	221 17	m0.7506	-5.63	+1.910	22 41.2	14 45.1
7	.3490	28.78	.1229	340 30	.2941	220 20	.7428	5.53	1.919	42.0	14 41.3
8	.3518	28.92	.1244	340 41	.2947	219 22	.7348	5.43	1.928	42.7	14 37.5
9	.3545	29.05	.1260	340 52	.2954	218 25	.7265	5.33	1.937	43.5	14 33.7
10	.3573	29.19	.1276	341 4	.2960	217 28	.7179	5.22	1.945	44.3	14 29.9
11	.3600	+29.33	1.1292	341 15	1.2966	216 31	m0.7090	-5.12	+1.955	22 45.0	14 26.1
12	.3627	29.47	.1308	341 26	.2972	215 35	.6997	5.01	1.965	45.7	14 22.3
13	.3655	29.61	.1324	341 37	.2978	214 39	.6901	4.90	1.974	46.5	14 18.6
14	.3682	29.76	.1340	341 48	.2983	213 42	.6802	4.80	1.984	47.2	14 14.8
15	.3709	29.90	.1357	341 58	.2989	212 46	.6700	4.68	1.993	47.9	14 11.1
16	.3737	+30.05	1.1374	342 9	1.2995	211 51	m0.6593	-4.56	+2.003	22 48.6	14 7.4
17	.3764	30.19	.1391	342 20	.3001	210 55	.6483	4.45	2.013	49.3	14 3.6
18	.3792	30.34	.1407	342 30	.3006	209 59	.6370	4.33	2.023	50.0	14 0.0
19	.3819	30.49	.1425	342 41	.3011	209 4	.6252	4.22	2.033	50.7	13 56.3
20	.3846	30.64	.1442	342 51	.3017	208 9	.6129	4.10	2.043	51.4	13 52.6
h (16.0) 21	.3874	+30.79	1.1459	343 1	1.3022	207 14	m0.6002	-3.98	+2.053	22 52.1	13 48.9
22	.3901	30.94	.1477	343 11	.3027	206 19	.5870	3.86	2.063	52.7	13 45.3
23	.3929	31.09	.1495	343 21	.3032	205 24	.5732	3.73	2.073	53.4	13 41.6
24	.3956	31.25	.1512	343 31	.3037	204 30	.5588	3.62	2.083	54.1	13 38.0
25	.3983	31.40	.1530	343 41	.3041	203 35	.5438	3.50	2.093	54.7	13 34.3
26	.4011	+31.56	1.1548	343 50	1.3046	202 41	m0.5282	-3.37	+2.104	22 55.3	13 30.7
27	.4038	31.72	.1566	344 0	.3050	201 47	.5119	3.25	2.114	56.0	13 27.1
28	.4065	31.87	.1585	344 9	.3055	200 53	.4948	3.12	2.125	56.6	13 23.5
29	.4093	32.03	.1603	344 18	.3059	199 59	.4770	3.00	2.136	57.2	13 19.9
30	.4120	32.19	.1621	344 27	.3063	199 5	.4592	2.87	2.146	57.8	13 16.3
31	.4148	32.35	.1640	344 36	.3066	198 11	.4384	2.74	2.157	58.4	13 12.7
June 1	.4175	+32.51	1.1658	344 44	1.3070	197 17	m0.4175	-2.61	+2.168	22 58.9	13 9.1
2	.4202	32.68	.1677	344 53	.3074	196 24	.3955	2.49	2.179	22 59.5	13 5.6
3	.4230	32.84	.1696	345 1	.3077	195 30	.3722	2.36	2.190	23 0.1	13 2.0
4	.4257	33.00	.1714	345 9	.3080	194 37	.3474	2.22	2.200	0.6	12 58.5
5	.4284	33.16	.1733	345 17	.3083	193 44	.3211	2.09	2.211	1.1	12 54.9
h (17.0) 6	.4312	+33.33	1.1752	345 25	1.3086	192 51	m0.2929	-1.96	+2.222	23 1.7	12 51.6
7	.4339	33.49	.1771	345 33	.3089	191 58	.2626	1.83	2.233	2.2	12 47.5
8	.4367	33.66	.1790	345 40	.3091	191 5	.2300	1.70	2.244	2.7	12 44.3
9	.4394	33.83	.1809	345 48	.3093	190 12	.1946	1.56	2.255	3.2	12 40.8
10	.4421	33.99	.1828	345 55	.3095	189 19	.1562	1.43	2.266	3.7	12 37.2
11	.4449	+34.16	1.1847	346 2	1.3097	188 26	m0.1136	-1.30	+2.277	23 4.1	12 33.7
12	.4476	34.33	.1866	346 8	.3099	187 33	.0655	1.16	2.289	4.5	12 30.2
13	.4503	34.49	.1886	346 15	.3100	186 40	.0121	1.03	2.300	5.0	12 26.7
14	.4531	34.66	.1905	346 22	.3102	185 48	.9511	0.89	2.311	5.5	12 23.2
15	.4558	34.83	.1924	346 28	.3103	184 55	.98790	0.76	2.322	5.9	12 19.7
16	.4586	+35.00	1.1943	346 34	1.3104	184 2	m9.7943	-0.62	+2.333	23 6.3	12 16.2
17	.4613	35.17	.1962	346 40	.3105	183 10	.96875	0.49	2.345	6.7	12 12.6
18	.4640	35.34	.1981	346 45	.3105	182 17	.95441	0.35	2.356	7.0	12 9.1
19	.4668	35.51	.2000	346 51	.3106	181 25	.93424	0.22	2.367	7.4	12 5.6
20	.4695	35.68	.2020	346 56	.3106	180 32	m8.9030	-0.08	2.379	7.7	12 2.1
h (18.0) 21	.4722	+35.85	1.2039	347 1	1.3106	179 40	p8.6990	+0.05	+2.390	23 8.1	11 58.6
22	.4750	36.02	.2057	347 6	.3106	178 47	.92500	0.18	2.401	8.4	11 55.1
23	.4777	36.18	.2076	347 11	.3105	177 55	.95068	0.32	2.412	8.7	11 51.6
24	.4805	36.35	.2095	347 16	.3105	177 2	.96594	0.46	2.423	9.0	11 48.1
25	.4832	36.52	.2114	347 20	.3104	176 10	.97723	0.59	2.435	9.3	11 44.6
26	.4859	+36.69	1.2133	347 25	1.3103	175 17	.98617	+0.72	+2.446	23 9.6	11 41.1
27	.4887	36.86	.2151	347 29	.3102	174 25	.99355	0.86	2.457	9.9	11 37.6
28	.4914	37.02	.2170	347 33	.3101	173 32	.99987	1.00	2.468	10.2	11 34.1
29	.4941	37.19	.2188	347 37	.3099	172 39	.0536	1.13	2.479	10.5	11 30.6
30	.4969	37.36	.2207	347 41	.3097	171 47	.01022	1.27	2.491	10.7	11 27.1
31	0.4996	+37.52	1.2225	347 44	1.3096	170 54	0.1464	+1.40	+2.502	23 10.9	11 23.6

## FOR WASHINGTON MEAN MIDNIGHT.

## QUANTITIES FOR REDUCING MEAN PLACES, 1879.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$ .	$f$ .	Log $g$ .	G.	Log $h$ .	H.	Log $i$ .	$i$ .	$f$ .	G.	H.
July 1	0.4996	+37.52	1.2225	347° 44'	1.3096	170° 54'	0.1464	+1.40	+2.502	23 10.9	11 23.6
2	.5024	37.69	.2243	347 48	.3094	170 1	.1853	1.53	2.513	11.2	11 20.1
3	.5061	37.86	.2261	347 51	.3091	169 9	.2214	1.66	2.524	11.4	11 16.6
4	.5078	38.02	.2279	347 54	.3089	168 16	.2547	1.80	2.535	11.6	11 13.0
5	.5106	39.19	.2297	347 57	.3086	167 23	.2853	1.93	2.546	11.8	11 9.5
6	.5133	+38.35	1.2315	348 0	1.3084	166 30	0.3140	+2.06	+2.557	23 12.0	11 6.0
(19.0) 7	.5161	38.52	.2333	348 3	.3081	165 37	.3407	2.19	2.568	12.2	11 2.5
8	.5188	38.68	.2351	348 5	.3078	164 44	.3658	2.32	2.579	12.3	10 58.9
9	.5215	38.84	.2369	348 8	.3074	163 50	.3893	2.45	2.589	12.5	10 55.4
10	.5243	39.00	.2386	348 10	.3071	162 57	.4116	2.58	2.600	12.7	10 51.8
11	.5270	+39.16	1.2403	348 12	1.3067	162 4	0.4327	+2.71	+2.611	23 12.8	10 48.2
12	.5297	39.32	.2420	348 14	.3064	161 10	.4528	2.84	2.622	12.9	10 44.7
13	.5325	39.48	.2437	348 16	.3060	160 17	.4716	2.96	2.632	13.1	10 41.1
14	.5352	39.64	.2454	348 18	.3056	159 23	.4897	3.09	2.643	13.2	10 37.5
15	.5380	39.80	.2471	348 20	.3052	158 29	.5069	3.21	2.653	13.3	10 33.9
16	.5407	+39.95	1.2488	348 22	1.3047	157 35	0.5233	+3.33	+2.664	23 13.5	10 30.3
17	.5434	40.11	.2504	348 23	.3043	156 41	.5392	3.46	2.674	13.6	10 26.8
18	.5462	40.26	.2521	348 25	.3038	155 47	.5542	3.58	2.684	13.7	10 23.1
19	.5489	40.42	.2537	348 26	.3034	154 53	.5687	3.70	2.694	13.7	10 19.5
20	.5516	40.57	.2553	348 27	.3029	153 58	.5826	3.82	2.705	13.8	10 15.9
21	.5544	+40.72	1.2569	348 28	1.3024	153 3	0.5959	+3.94	+2.715	23 13.9	10 12.2
(20.0) 22	.5571	40.87	.2584	348 29	.3019	152 9	.6086	4.06	2.725	13.9	10 8.6
23	.5599	41.02	.2600	348 30	.3013	151 14	.6209	4.18	2.734	14.0	10 5.0
24	.5626	41.16	.2615	348 31	.3008	150 19	.6328	4.29	2.744	14.1	10 1.3
25	.5653	41.31	.2630	348 32	.3003	149 24	.6443	4.41	2.754	14.1	9 57.6
26	.5681	+41.46	1.2646	348 33	1.2997	148 29	0.6553	+4.52	+2.764	23 14.2	9 54.0
27	.5708	41.60	.2661	348 33	.2991	147 34	.6660	4.63	2.774	14.2	9 50.3
28	.5735	41.75	.2675	348 34	.2986	146 38	.6763	4.74	2.783	14.3	9 46.6
29	.5763	41.89	.2690	348 34	.2980	145 43	.6863	4.86	2.793	14.3	9 42.8
30	.5790	42.03	.2705	348 35	.2974	144 47	.6959	4.97	2.802	14.3	9 39.1
31	.5818	42.17	.2719	348 35	.2968	143 51	.7051	5.07	2.811	14.3	9 35.4
Aug. 1	.5845	+42.31	1.2733	348 36	1.2962	142 55	0.7139	+5.17	+2.821	23 14.4	9 31.6
2	.5872	42.45	.2747	348 36	.2956	141 58	.7226	5.28	2.830	14.4	9 27.9
3	.5900	42.58	.2761	348 37	.2950	141 2	.7310	5.38	2.839	14.5	9 24.1
4	.5927	42.72	.2775	348 37	.2944	140 5	.7391	5.48	2.848	14.5	9 20.3
5	.5955	42.85	.2788	348 37	.2938	139 8	.7470	5.58	2.857	14.5	9 16.5
(21.0) 6	.5982	+42.99	1.2802	348 37	1.2931	138 11	0.7546	+5.68	+2.866	23 14.5	9 12.7
7	.6009	43.12	.2815	348 37	.2925	137 14	.7618	5.77	2.875	14.5	9 8.9
8	.6037	43.25	.2828	348 37	.2919	136 16	.7689	5.87	2.883	14.5	9 5.1
9	.6064	43.38	.2841	348 38	.2913	135 18	.7758	5.97	2.892	14.5	9 1.2
10	.6091	43.51	.2853	348 38	.2906	134 20	.7825	6.06	2.900	14.5	8 57.4
11	.6119	+43.63	1.2866	348 38	1.2900	133 22	0.7889	+6.15	+2.909	23 14.5	8 53.5
12	.6146	43.76	.2878	348 38	.2894	132 24	.7951	6.24	2.917	14.5	8 49.6
13	.6174	43.88	.2891	348 38	.2887	131 26	.8011	6.32	2.925	14.5	8 45.7
14	.6201	44.00	.2903	348 38	.2881	130 27	.8069	6.41	2.933	14.5	8 41.8
15	.6228	44.12	.2915	348 38	.2875	129 28	.8125	6.49	2.941	14.5	8 37.9
16	.6256	+44.24	1.2926	348 38	1.2869	128 29	0.8179	+6.58	+2.949	23 14.5	8 34.0
17	.6283	44.36	.2938	348 39	.2863	127 30	.8232	6.65	2.957	14.6	8 30.0
18	.6310	44.47	.2949	348 39	.2857	126 31	.8282	6.73	2.965	14.6	8 26.1
19	.6338	44.59	.2961	348 39	.2851	125 32	.8331	6.81	2.973	14.6	8 22.1
20	.6365	44.70	.2972	348 39	.2845	124 32	.8377	6.88	2.980	14.6	8 18.1
(22.0) 21	.6393	+44.82	1.2983	348 39	1.2839	123 32	0.8423	+6.95	+2.988	23 14.6	8 14.1
22	.6420	44.93	.2994	348 40	.2833	122 32	.8467	7.03	2.995	14.7	8 10.1
23	.6447	45.04	.3004	348 40	.2827	121 32	.8509	7.10	3.003	14.7	8 6.1
24	.6475	45.15	.3015	348 40	.2822	120 31	.8550	7.16	3.010	14.7	8 2.1
25	.6502	45.26	.3025	348 41	.2816	119 30	.8589	7.23	3.018	14.7	7 58.0
26	.6530	+45.37	1.3036	348 41	1.2811	118 29	0.8626	+7.29	+3.025	23 14.7	7 54.0
27	.6557	45.48	.3046	348 41	.2806	117 28	.8662	7.35	3.032	14.7	7 49.9
28	.6584	45.58	.3056	348 42	.2800	116 27	.8695	7.40	3.039	14.7	7 45.8
29	.6612	45.69	.3065	348 42	.2795	115 26	.8728	7.46	3.046	14.8	7 41.7
30	.6639	45.79	.3075	348 43	.2791	114 24	.8759	7.51	3.053	14.9	7 37.6
31	0.6666	+45.90	1.3085	348 44	1.2786	113 23	0.8789	+7.57	+3.060	23 14.9	7 33.5

## FOR WASHINGTON MEAN MIDNIGHT.

## QUANTITIES FOR REDUCING MEAN PLACES, 1879.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$ .	$f$ .	Log $g$ .	$G$ .	Log $h$ .	$H$ .	Log $i$ .	$i$ .	$f$ .	$G$ .	$H$ .
Sept. 1	$\overset{y}{0.6694}$	$\overset{y}{+46.00}$	1.3095	$348^{\circ} 44'$	1.2782	$112^{\circ} 21'$	0.8817	$+7.62$	$\overset{s}{+3.067}$	$\overset{h}{23} \overset{m}{14.9}$	$\overset{h}{7} \overset{m}{29.4}$
2	.6721	46.10	.3104	348 45	.2777	111 19	.8844	7.66	3.073	15.0	7 25.3
3	.6749	46.20	.3113	348 46	.2773	110 17	.8870	7.71	3.080	15.1	7 21.1
4	$\overset{b}{.6776}$	46.30	.3122	348 47	.2769	109 15	.8894	7.75	3.087	15.1	7 17.0
$\overset{b}{(23.0)}$ 5	.6803	46.40	.3131	348 48	.2765	108 12	.8917	7.79	3.094	15.2	7 12.8
6	.6831	$\overset{y}{+46.50}$	1.3140	348 49	1.2761	107 10	0.8938	$+7.83$	$\overset{s}{+3.100}$	$\overset{h}{23} \overset{m}{15.3}$	$\overset{h}{7} \overset{m}{8.6}$
7	.6858	46.60	.3149	348 50	.2758	106 7	.8959	7.87	3.106	15.3	7 4.4
8	.6885	46.70	.3158	348 51	.2754	105 4	.8978	7.90	3.113	15.4	7 0.3
9	.6913	46.79	.3167	348 52	.2751	104 1	.8996	7.94	3.119	15.5	6 56.1
10	.6940	46.89	.3175	348 53	.2749	102 58	.9012	7.97	3.126	15.5	6 51.9
11	.6968	$\overset{y}{+46.98}$	1.3184	348 55	1.2746	101 55	0.9026	$+7.99$	$\overset{s}{+3.132}$	$\overset{h}{23} \overset{m}{15.6}$	$\overset{h}{6} \overset{m}{47.6}$
12	.6995	47.08	.3192	348 56	.2743	100 51	.9040	8.02	3.139	15.7	6 43.4
13	.7022	47.17	.3200	348 58	.2741	99 48	.9052	8.04	3.145	15.8	6 39.2
14	.7050	47.27	.3209	348 59	.2739	98 44	.9063	8.06	3.151	15.9	6 35.0
15	.7077	47.36	.3217	349 1	.2737	97 41	.9073	8.08	3.157	16.1	6 30.7
16	.7105	$\overset{y}{+47.46}$	1.3225	349 3	1.2736	96 37	0.9081	$+8.09$	$\overset{s}{+3.164}$	$\overset{h}{23} \overset{m}{16.2}$	$\overset{h}{6} \overset{m}{26.5}$
17	.7131	47.55	.3233	349 5	.2734	95 34	.9089	8.11	3.170	16.3	6 22.2
18	.7159	47.64	.3241	349 7	.2733	94 30	.9095	8.12	3.176	16.5	6 18.0
19	.7187	47.73	.3249	349 9	.2732	93 26	.9099	8.13	3.182	16.6	6 13.7
20	.7214	47.83	.3257	349 11	.2732	92 22	.9102	8.13	3.189	16.7	6 9.4
$\overset{b}{(0.0)}$ 21	.7241	$\overset{y}{+47.92}$	1.3264	349 13	1.2731	91 18	0.9105	$+8.14$	$\overset{s}{+3.195}$	$\overset{h}{23} \overset{m}{16.9}$	$\overset{h}{6} \overset{m}{5.2}$
22	.7269	48.01	.3272	349 16	.2731	90 14	.9106	8.14	3.201	17.1	6 0.9
23	.7296	48.10	.3280	349 18	.2731	89 9	.9105	8.14	3.207	17.2	5 56.6
24	.7324	48.19	.3288	349 21	.2732	88 5	.9104	8.14	3.213	17.4	5 52.3
25	.7351	48.28	.3295	349 23	.2732	87 1	.9101	8.13	3.219	17.5	5 48.1
26	.7378	$\overset{y}{+48.37}$	1.3303	349 26	1.2733	85 57	0.9096	$+8.12$	$\overset{s}{+3.225}$	$\overset{h}{23} \overset{m}{17.7}$	$\overset{h}{5} \overset{m}{43.8}$
27	.7406	48.46	.3311	349 29	.2734	84 53	.9091	8.11	3.231	17.9	5 39.5
28	.7433	48.56	.3318	349 32	.2735	83 49	.9084	8.10	3.237	18.1	5 35.2
29	.7460	48.65	.3326	349 35	.2737	82 44	.9076	8.08	3.243	18.3	5 31.0
30	.7488	48.74	.3333	349 38	.2739	81 40	.9067	8.07	3.250	18.5	5 26.7
Oct. 1	.7515	$\overset{y}{+48.84}$	1.3342	349 41	1.2741	80 36	0.9056	$+8.05$	$\overset{s}{+3.256}$	$\overset{h}{23} \overset{m}{18.7}$	$\overset{h}{5} \overset{m}{22.4}$
2	.7542	48.93	.3349	349 44	.2743	79 32	.9044	8.02	3.262	18.9	5 18.1
3	.7570	49.02	.3356	349 48	.2745	78 28	.9031	8.00	3.268	19.2	5 13.9
4	.7597	49.12	.3364	349 51	.2748	77 24	.9016	7.97	3.275	19.4	5 9.6
5	.7625	49.21	.3372	349 55	.2751	76 20	.9000	7.94	3.281	19.7	5 5.3
$\overset{b}{(1.0)}$ 6	.7652	$\overset{y}{+49.31}$	1.3379	349 58	1.2754	75 16	0.8993	$+7.91$	$\overset{s}{+3.287}$	$\overset{h}{23} \overset{m}{19.9}$	$\overset{h}{5} \overset{m}{1.1}$
7	.7679	49.40	.3387	350 2	.2757	74 12	.8964	7.88	3.294	20.1	4 56.8
8	.7707	49.50	.3394	350 6	.2761	73 8	.8944	7.84	3.300	20.4	4 52.5
9	.7734	49.60	.3402	350 10	.2764	72 4	.8923	7.80	3.307	20.7	4 48.3
10	.7761	49.70	.3410	350 14	.2768	71 1	.8900	7.76	3.313	20.9	4 44.0
11	.7789	$\overset{y}{+49.80}$	1.3418	350 18	1.2772	69 57	0.8875	$+7.72$	$\overset{s}{+3.320}$	$\overset{h}{23} \overset{m}{21.2}$	$\overset{h}{4} \overset{m}{39.8}$
12	.7816	49.90	.3426	350 22	.2776	68 54	.8849	7.67	3.327	21.5	4 35.6
13	.7844	50.00	.3434	350 26	.2781	67 50	.8822	7.62	3.334	21.7	4 31.3
14	.7871	50.10	.3442	350 30	.2785	66 47	.8793	7.57	3.340	22.0	4 27.1
15	.7898	50.21	.3450	350 35	.2790	65 44	.8763	7.52	3.347	22.3	4 22.9
16	.7926	$\overset{y}{+50.31}$	1.3458	350 39	1.2795	64 41	0.8731	$+7.47$	$\overset{s}{+3.354}$	$\overset{h}{23} \overset{m}{22.6}$	$\overset{h}{4} \overset{m}{18.7}$
17	.7953	50.41	.3466	350 44	.2800	63 38	.8697	7.41	3.361	22.9	4 14.5
18	.7981	50.52	.3474	350 48	.2805	62 35	.8662	7.35	3.368	23.2	4 10.3
19	.8008	50.62	.3482	350 53	.2811	61 32	.8626	7.29	3.375	23.5	4 6.1
20	.8035	50.73	.3490	350 58	.2816	60 29	.8587	7.22	3.382	23.8	4 1.9
$\overset{b}{(2.0)}$ 21	.8063	$\overset{y}{+50.84}$	1.3498	351 2	1.2822	59 26	0.8547	$+7.16$	$\overset{s}{+3.390}$	$\overset{h}{23} \overset{m}{24.1}$	$\overset{h}{3} \overset{m}{57.8}$
22	.8090	50.95	.3507	351 7	.2828	58 24	.8505	7.09	3.397	24.5	3 53.6
23	.8117	51.07	.3516	351 12	.2833	57 22	.8462	7.02	3.404	24.8	3 49.5
24	.8145	51.18	.3524	351 17	.2839	56 19	.8417	6.94	3.412	25.1	3 45.3
25	.8172	51.29	.3533	351 22	.2846	55 17	.8369	6.87	3.419	25.4	3 41.3
26	.8200	51.40	.3542	351 27	.2852	54 15	.8320	6.79	3.427	25.8	3 37.0
27	.8227	$\overset{y}{+51.52}$	1.3551	351 32	1.2858	53 14	0.8269	$+6.71$	$\overset{s}{+3.435}$	$\overset{h}{23} \overset{m}{26.1}$	$\overset{h}{3} \overset{m}{32.9}$
28	.8254	51.64	.3560	351 37	.2864	52 12	.8216	6.63	3.443	26.5	3 28.8
29	.8281	51.76	.3569	351 42	.2870	51 11	.8161	6.55	3.451	26.8	3 24.7
30	.8309	51.88	.3578	351 47	.2877	50 10	.8104	6.46	3.459	27.1	3 20.6
31	.8337	52.00	.3588	351 52	.2883	49 9	.8045	6.37	3.467	27.5	3 16.6
32	0.8364	$\overset{y}{+52.13}$	1.3597	351 57	1.2890	48 8	0.7984	$+6.29$	$\overset{s}{+3.475}$	$\overset{h}{23} \overset{m}{27.8}$	$\overset{h}{3} \overset{m}{12.5}$

**202**

**203**

# BESSEL'S FORMULÆ OF REDUCTION FOR THE FIXED STARS,

WITH DR. PETERS'S COEFFICIENTS, AND BESSEL'S NOTATION.

$$A = \tau - 0.34246 \sin 2 \odot + 0.00410 \sin 2 \odot - 0.02519 \sin 2 \odot + 0.00293 \sin (\odot + 82^\circ 13').$$

$$B = -9''.2238 \cos \odot + 0''.0895 \cos 2 \odot - 0''.5506 \cos 2 \odot - 0''.0092 \cos (\odot + 280^\circ 51').$$

$$C = -20''.4451 \cos \omega \cos \odot.$$

$$D = -20''.4451 \sin \odot.$$

$$E = -0''.0457 \sin \odot + 0''.0014 \sin 2 \odot - 0''.0033 \sin 2 \odot.$$

$$a = 3''.07232 + 1''.33692 \sin \alpha \tan \delta.$$

$$b = \frac{1}{\gamma} \cos \alpha \tan \delta.$$

$$c = \frac{1}{\gamma} \cos \alpha \sec \delta.$$

$$d = \frac{1}{\gamma} \sin \alpha \sec \delta.$$

$$a' = 20''.0539 \cos \alpha.$$

$$b' = -\sin \alpha.$$

$$c' = \tan \omega \cos \delta - \sin \alpha \sin \delta.$$

$$d' = \cos \alpha \sin \delta.$$

$\mu$  = the annual proper motion in right ascension.

$\mu'$  = the annual proper motion in declination.

$\tau$  = the time reckoned from Jan. 0 + .016, (when the sun's mean longitude is  $280^\circ$ ), expressed in fractional parts of a tropical year.

$\odot$  = the sun's true longitude.

$\odot$  = the longitude of the moon's ascending node.

$\omega$  = the obliquity of the ecliptic.

$\alpha$  = the star's mean right ascension for the beginning of the year.

$\delta$  = the star's mean declination for the beginning of the year.

$\alpha'$  = the star's apparent right ascension at the time  $\tau$ .

$\delta'$  = the star's apparent declination at the time  $\tau$ .

$$\alpha' - \alpha = A a + B b + C c + D d + E + \tau \mu. \quad (\text{in time})$$

$$\delta' - \delta = A a' + B b' + C c' + D d' + \tau \mu'. \quad (\text{in arc})$$

The following formulæ may also be used by putting

$$f = 46''.0848 A + E = 3''.07232 A + \frac{1}{\gamma} E. \quad i = C \tan \omega.$$

$$g \cos G = 20''.0539 A.$$

$$h \sin H = C.$$

$$g \sin G = B.$$

$$h \cos H = D.$$

$$\alpha' - \alpha = f + \tau \mu + g \sin (G + \alpha) \frac{\tan \delta}{15} + h \sin (H + \alpha) \frac{\sec \delta}{15}. \quad (\text{in time})$$

$$\delta' - \delta = \tau \mu' + g \cos (G + \alpha) + h \cos (H + \alpha) \sin \delta + i \cos \delta. \quad (\text{in arc})$$

A and B include also the following small terms of nutation, the combined values of which in 1879 are given in Table V. of the Appendix.

$$\begin{aligned} \Delta A = & +.00025 \sin (2 \odot - \odot) + .00009 \sin (2 \Gamma' - \odot). & \Delta B = & +.00067 \cos (2 \odot - \odot). \\ & +.00010 \sin 2 (\odot - \Gamma') + .00005 \cos \Gamma'. & & -0.0027 \cos (3 \odot - \Gamma). \\ & -.00005 \sin 2 (\odot - \odot) + .00004 \sin 2 \Gamma'. & & +0.0024 \cos (2 \Gamma' - \odot). \\ & -.00011 \sin (3 \odot - \Gamma). & & -0.0023 \sin \Gamma'. \\ & & & +0.0008 \cos 2 \Gamma'. \end{aligned}$$

Table IV. of the Appendix contains the following terms:

$$A \zeta = -.00405 \sin 2 \zeta.$$

$$B \zeta = -.00085 \cos 2 \zeta.$$

$$A' \zeta = +.00135 \sin (\zeta - \Gamma').$$

Tables VI. and VII. facilitate finding the corresponding reductions of Right Ascensions and Declinations. In these terms:

$\zeta$  = the moon's mean longitude.

$\Gamma$  = the longitude of the sun's perigee.

$\Gamma'$  = the longitude of the moon's perigee.

Other terms, which become sensible for stars very near the pole, will be found on page 487.

MEAN PLACES FOR 1879.0. (Jan. 0<sup>d</sup> +.016, Washington.)

Star's Name.	Magnitude.	Right Ascension.			An. Variation.	Declination.			An. Variation.
		<sup>h</sup>	<sup>m</sup>	<sup>s</sup>		<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	
$\alpha$ Andromedæ . . .	2	0	2	8.089	+ 3.089	+28	25	21.30	+19.90
$\gamma$ Pegasi ( <i>Algenib</i> ) .	3.2	0	7	0.365	3.084	+14	30	39.74	20.04
$\beta$ Hydri . . . . .	3	0	19	21.885	3.244	-77	56	12.23	20.25
$\alpha$ Cassiopeæ . . . .	var.	0	33	38.975	3.369	+55	52	24.24	19.80
$\beta$ Ceti . . . . .	2	0	37	30.860	3.013	-18	39	3.26	19.83
$\cdot$ 21 Cassiopeæ . . . .	6	0	37	40.876	+ 3.840	+74	19	32.67	+19.72
$\epsilon$ Piscium . . . . .	4	0	56	39.860	3.110	+ 7	14	18.36	19.46
$\alpha$ Ursæ Min. ( <i>Polaris</i> )	2	1	14	24.861	21.485	+88	39	49.92	19.00
$\theta^1$ Ceti . . . . .	3	1	17	58.524	2.998	- 8	48	28.11	18.71
$\cdot$ 38 Cassiopeæ . . . .	6	1	22	14.852	4.362	+69	38	27.69	18.70
$\eta$ Piscium . . . . .	4.3	1	25	0.521	+ 3.201	+14	43	18.65	+18.71
$\alpha$ Eridani ( <i>Achernar</i> )	1	1	33	12.133	2.233	-57	51	5.79	18.40
$\rho$ Piscium . . . . .	4	1	39	0.370	3.163	+ 8	32	53.40	18.25
$\beta$ Arietis . . . . .	3.2	1	47	57.444	3.302	+20	12	58.14	17.78
$\cdot$ 50 Cassiopeæ . . . .	4	1	53	7.822	4.991	+71	50	3.44	17.66
$\alpha$ Arietis . . . . .	2	2	0	21.269	+ 3.369	+22	53	22.88	+17.22
$\xi^1$ Ceti . . . . .	4.5	2	6	35.190	3.170	+ 8	16	42.01	17.06
$\cdot$ $\epsilon$ Cassiopeæ . . . .	4	2	19	6.738	4.849	+66	51	24.04	16.45
$\gamma$ Ceti . . . . .	3.4	2	37	1.909	3.104	+ 2	43	30.24	15.37
$\alpha$ Ceti . . . . .	2.3	2	55	57.299	3.129	+ 3	36	50.32	14.33
$\cdot$ 48 Cephei (H.) . . .	6	3	5	1.415	+ 7.370	+77	17	13.48	+13.80
$\zeta$ Arietis . . . . .	4.5	3	7	56.895	3.438	+20	35	42.70	13.62
$\alpha$ Persei . . . . .	2	3	15	41.369	4.252	+49	25	43.52	13.13
$\delta$ Persei . . . . .	3	3	34	18.737	4.243	+47	23	55.47	11.86
$\eta$ Tauri . . . . .	3	3	40	17.583	3.555	+23	43	46.71	11.43
$\zeta$ Persei . . . . .	3	3	46	31.683	+ 3.758	+31	31	21.91	+11.00
$\gamma^1$ Eridani . . . . .	3	3	52	23.050	2.797	-13	51	12.59	10.51
$\gamma$ Tauri . . . . .	4	4	12	54.501	3.408	+15	20	3.27	9.03
$\epsilon$ Tauri . . . . .	4.3	4	21	33.116	3.497	+18	54	39.11	8.34
$\alpha$ Tauri ( <i>Aldebaran</i> ) .	1	4	28	58.716	3.437	+16	15	53.35	7.59
$\cdot$ 9 Camelopardalis . .	4	4	42	1.678	+ 5.918	+66	8	4.16	+ 6.70
$\epsilon$ Aurigæ . . . . .	3	4	49	6.892	3.898	+32	58	22.50	6.09
$\cdot$ 11 Orionis . . . . .	5	4	57	39.400	3.425	+15	14	3.32	5.37
$\alpha$ Aurigæ ( <i>Capella</i> ) .	1	5	7	45.136	4.423	+45	52	22.24	4.11
$\beta$ Orionis ( <i>Rigel</i> ) . .	1	5	8	43.384	2.881	- 8	20	33.69	-4.45
$\beta$ Tauri . . . . .	2	5	18	38.604	+ 3.789	+28	30	12.50	+ 3.43
$\cdot$ Groombridge 966 . .	6.7	5	23	33.587	7.994	+74	57	34.37	3.17
$\delta$ Orionis . . . . .	2	5	25	49.551	3.064	- 0	23	24.73	2.96
$\alpha$ Leporis . . . . .	3	5	27	23.700	2.646	-17	54	35.65	2.87
$\epsilon$ Orionis . . . . .	2	5	30	4.433	3.042	- 1	16	49.98	2.61
$\alpha$ Columbæ . . . . .	2	5	35	16.129	+ 2.173	-34	8	21.62	+ 2.14
$\alpha$ Orionis . . . . .	var.	5	48	37.291	3.247	+ 7	22	59.03	+ 1.01
$\cdot$ 22 Camelopardalis (H.)	5.4	6	5	30.407	6.618	+69	21	33.30	- 0.60
$\mu$ Geminorum . . . .	3	6	15	38.457	3.633	+22	34	26.94	1.48
$\alpha$ Argus ( <i>Canopus</i> ) . .	1	6	21	16.052	1.331	-52	37	48.70	1.86
$\gamma$ Geminorum . . . .	2.3	6	30	43.336	+ 3.468	+16	30	4.28	- 2.71
$\alpha$ Canis Maj. ( <i>Sirius</i> ) .	1	6	39	48.935	2.645	-16	33	4.30	4.68
$\cdot$ 51 Cephei (H.) . . .	5	6	43	15.205	30.149	+87	13	49.54	3.80
$\epsilon$ Canis Majoris . . .	2.1	6	53	52.313	2.358	-28	48	30.29	4.67
$\delta$ Canis Majoris . . .	2	7	3	28.351	+ 2.440	-26	12	5.99	- 5.45

\* Circumpolar Stars.

MEAN PLACES FOR 1879.0. (Jan. 0+.016, Washington.) <sup>d</sup>					
Star's Name.	Magnitude.	Right Ascension.	An. Variation.	Declination.	An. Variation.
$\delta$ Geminorum . . .	3.4	<sup>h</sup> 7 <sup>m</sup> 12 <sup>s</sup> 53.797	+ 3.590	+ 22° 12' 13.55"	— 6.27
• $\pi$ Piazzi vii. 67. . .	6	7 18 16.658	6.307	+ 68 42 34.63	6.79
$\alpha$ Geminor. ( <i>Castor</i> ) .	2.1	7 26 52.401	3.838	+ 32 9 7.92	7.51
$\alpha$ Can. Min. ( <i>Procyon</i> ) .	1	7 32 58.143	3.146	+ 5 32 1.13	8.96
$\beta$ Geminor. ( <i>Pollux</i> ) .	1.2	7 37 54.638	3.681	+ 28 19 1.64	8.35
$\varphi$ Geminorum . . .	5	7 46 5.511	+ 3.683	+ 27 4 39.23	— 8.97
• 3 Ursæ Majoris (H.) .	6	8 0 45.228	6.061	+ 68 49 39.31	10.09
15 Argus ( $\iota$ ) . . .	3	8 2 23.551	2.556	— 23 57 22.33	10.14
$\epsilon$ Hydræ . . .	3.4	8 40 22.118	3.184	+ 6 51 43.04	12.94
$\epsilon$ Ursæ Majoris . . .	3	8 50 54.982	4.137	+ 48 30 54.88	13.88
• $\sigma^3$ Ursæ Majoris . . .	5	8 59 43.537	+ 5.368	+ 67 37 24.39	— 14.26
$\kappa$ Cancrī . . .	5	9 1 11.531	3.254	+ 11 9 15.89	14.23
$\epsilon$ Argus . . .	2	9 13 50.961	1.601	— 58 46 1.42	14.94
• 1 Draconis (H.) . . .	4.5	9 19 42.350	9.082	+ 81 51 32.59	15.34
$\alpha$ Hydræ . . .	2	9 21 38.501	2.949	— 8 8 5.10	15.41
• $\delta$ Ursæ Majoris . . .	5.4	9 23 45.223	+ 5.417	+ 70 21 37.52	— 15.53
$\theta$ Ursæ Majoris . . .	3	9 24 45.285	4.047	+ 52 13 39.60	16.18
$\epsilon$ Leonis . . .	3	9 38 58.895	3.419	+ 24 19 50.66	16.39
$\mu$ Leonis . . .	4	9 45 52.744	3.423	+ 26 34 34.12	16.76
$\alpha$ Leonis ( <i>Regulus</i> ) .	1.2	10 1 55.661	3.203	+ 12 33 29.70	17.43
• 32 Ursæ Majoris . . .	6	10 9 13.756	+ 4.432	+ 65 42 38.85	— 17.79
$\gamma^1$ Leonis . . .	2	10 13 17.978	3.316	+ 20 27 11.95	18.04
• 9 Draconis (H.) . . .	5.4	10 24 46.223	5.291	+ 76 20 6.53	18.38
$\rho$ Leonis . . .	4	10 26 26.419	3.166	+ 9 55 43.80	18.40
$\eta$ Argus . . .	2	10 40 22.154	2.311	— 59 2 51.58	18.76
$\iota$ Leonis . . .	5	10 42 53.769	+ 3.159	+ 11 11 7.27	— 18.93
$\alpha$ Ursæ Majoris . . .	2	10 56 14.859	3.755	+ 62 24 13.18	19.37
$\delta$ Leonis . . .	2.3	11 7 40.370	3.201	+ 21 11 11.87	19.66
$\delta$ Crateris . . .	3.4	11 13 17.546	2.996	— 14 7 25.48	19.45
$\tau$ Leonis . . .	5	11 21 42.906	3.088	+ 3 31 21.39	19.78
• $\lambda$ Draconis . . .	3.4	11 24 12.102	+ 3.633	+ 69 59 53.57	— 19.87
$\nu$ Leonis . . .	5.4	11 30 45.254	3.071	— 0 9 20.22	19.84
$\beta$ Leonis . . .	3	11 42 53.234	3.065	+ 15 14 55.50	20.09
$\gamma$ Ursæ Majoris . . .	2.3	11 47 27.597	3.186	+ 54 22 2.90	20.02
$\sigma$ Virginis . . .	4	11 59 2.753	3.060	+ 9 24 19.11	20.00
• 4 Draconis (H.) . . .	5.4	12 6 30.979	+ 2.898	+ 78 17 17.45	— 20.05
• $\beta$ Chamæleontis . . .	5	12 11 16.051	3.355	— 78 38 26.33	20.04
$\eta$ Virginis . . .	3.4	12 13 42.959	3.069	+ 0 0 21.50	20.03
$\alpha^1$ Crucis . . .	1	12 19 52.106	3.271	— 62 25 37.54	19.93
$\beta$ Corvi . . .	2.3	12 28 1.989	3.140	— 22 43 36.85	19.95
• $\kappa$ Draconis . . .	3.4	12 28 18.685	+ 2.598	+ 70 27 17.74	— 19.92
• 32 Camelop. (H.) ( <i>fol.</i> )	5.4	12 48 15.255	0.370	+ 84 4 12.48	19.63
12 Canum Venaticorum.	3	12 50 21.951	2.816	+ 38 58 20.33	19.51
$\theta$ Virginis . . .	4.5	13 3 41.189	3.101	— 4 53 32.47	19.31
$\alpha$ Virginis ( <i>Spica</i> ) .	1	13 18 49.216	3.154	— 10 31 44.21	18.90
$\zeta$ Virginis . . .	3.4	13 28 31.708	+ 3.054	+ 0 1 25.20	— 18.51
$\eta$ Ursæ Majoris . . .	2	13 42 46.351	2.373	+ 49 55 3.57	18.09
$\eta$ Bootis . . .	3	13 48 55.456	2.858	+ 19 0 18.90	18.16
$\beta$ Centauri . . .	1	13 55 17.743	4.169	— 59 47 18.47	17.64
• $\alpha$ Draconis . . .	3.4	14 1 6.872	+ 1.623	+ 64 57 14.18	— 17.36

<sup>d</sup> Circumpolar Stars.

## MEAN PLACES FOR 1879.0. (Jan. 0 + .016, Washington.)

Star's Name.	Magnitude.	Right Ascension.			An. Variation.	Declination.	An. Variation.
		<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>s</sup>		
$\alpha$ Bootis ( <i>Arcturus</i> ) . . . . .	1	14	10	8.551	+ 2.735	+ 19° 48' 48.59	- 18.87
$\theta$ Bootis . . . . .	4.3	14	21	4.617	+ 2.043	+ 52 24 38.58	16.77
$\delta$ Ursæ Minoris . . . . .	5.4	14	27	47.956	- 0.202	+ 76 14 0.21	16.04
$\alpha^2$ Centauri . . . . .	1	14	31	24.579	+ 4.038	- 60 19 54.74	15.01
$\epsilon$ Bootis . . . . .	2.3	14	39	42.196	+ 2.622	+ 27 35 7.32	15.35
$\alpha^3$ Libræ . . . . .	2.3	14	44	11.165	+ 3.308	- 15 32 15.24	- 15.18
$\beta$ Ursæ Minoris . . . . .	2	14	51	4.422	- 0.241	+ 74 38 58.34	14.75
$\beta$ Bootis . . . . .	3	14	57	23.288	+ 2.260	+ 40 52 7.07	14.38
$\beta$ Libræ . . . . .	2	15	10	29.818	+ 3.220	- 8 56 5.62	13.52
$\mu^1$ Bootis . . . . .	4.3	15	19	55.234	+ 2.268	+ 37 48 9.08	12.80
$\gamma^2$ Ursæ Minoris . . . . .	3	15	20	55.921	- 0.141	+ 72 15 52.94	- 12.79
$\alpha$ Coronæ Borealis . . . . .	2	15	29	33.912	+ 2.539	+ 27 7 23.42	12.32
$\alpha$ Serpentis . . . . .	2.3	15	38	18.491	+ 2.950	+ 6 48 27.87	11.57
$\epsilon$ Serpentis . . . . .	3.4	15	44	47.125	+ 2.988	+ 4 50 35.95	11.08
$\zeta$ Ursæ Minoris . . . . .	4.5	15	48	24.816	- 2.272	+ 78 9 57.32	10.89
$\epsilon$ Coronæ Borealis . . . . .	4	15	52	34.810	+ 2.486	+ 27 13 46.84	- 10.61
$\delta$ Scorpii . . . . .	2.3	15	53	10.820	+ 3.538	- 22 16 30.86	10.54
$\beta^1$ Scorpii . . . . .	2	15	58	24.131	+ 3.478	- 19 28 21.61	10.16
Groombridge 2320 . . . . .	6.5	16	5	59.667	+ 0.136	+ 68 7 44.45	9.50
$\delta$ Ophiuchi . . . . .	3	16	8	0.306	+ 3.139	- 3 22 51.76	9.54
$\tau$ Herculis . . . . .	3.4	16	16	6.106	+ 1.798	+ 46 36 8.09	- 8.76
$\alpha$ Scorpii ( <i>Antares</i> ) . . . . .	1.2	16	21	59.432	+ 3.670	- 26 9 41.94	8.34
$\eta$ Draconis . . . . .	3.2	16	22	21.404	+ 0.805	+ 61 47 18.22	8.22
$\Lambda$ Draconis . . . . .	5	16	28	13.682	- 0.138	+ 69 1 47.55	7.79
$\zeta$ Ophiuchi . . . . .	3.2	16	30	29.813	+ 3.299	- 10 19 12.30	7.58
$\alpha$ Trianguli Australis . . . . .	2	16	35	52.128	+ 6.290	- 68 48 9.92	- 7.27
$\eta$ Herculis . . . . .	3	16	38	44.860	+ 2.055	+ 39 9 13.22	7.02
$\kappa$ Ophiuchi . . . . .	3.4	16	51	56.417	+ 2.835	+ 9 33 53.47	5.84
$d$ Herculis . . . . .	5	16	57	8.162	+ 2.210	+ 33 44 41.62	5.40
$\epsilon$ Ursæ Minoris . . . . .	4.5	16	58	25.427	- 6.364	+ 82 14 1.55	5.33
$\alpha^1$ Herculis . . . . .	var.	17	9	7.814	+ 2.734	+ 14 31 47.32	- 4.36
$\delta$ Ophiuchi . . . . .	5	17	18	58.873	+ 3.660	- 24 3 41.48	3.65
$\beta$ Draconis . . . . .	3.2	17	27	41.883	+ 1.351	+ 52 23 29.02	2.82
$\alpha$ Ophiuchi . . . . .	2	17	29	19.047	+ 2.783	+ 12 38 58.95	2.89
$\omega$ Draconis . . . . .	5	17	37	39.700	- 0.355	+ 68 48 47.32	1.66
$\mu$ Herculis . . . . .	3.4	17	41	43.392	+ 2.345	+ 27 47 34.36	- 2.32
$\gamma^1$ Draconis ( <i>pr.</i> ) . . . . .	4.5	17	44	5.558	- 1.081	+ 72 12 28.21	1.65
$\gamma$ Draconis . . . . .	2.3	17	53	47.945	+ 1.394	+ 51 30 13.10	0.58
$\gamma^2$ Sagittarii . . . . .	3.4	17	58	2 134	+ 3.853	- 30 25 25.32	- 0.39
$\mu^1$ Sagittarii . . . . .	4	18	6	31.616	+ 3.586	- 21 5 18.73	+ 0.58
$\delta$ Ursæ Minoris . . . . .	4.5	18	11	21.609	- 19.433	+ 86 36 31.79	+ 1.04
$\eta$ Serpentis . . . . .	3	18	15	2.843	+ 3.100	- 2 55 42.04	0.65
$\sigma$ Octantis . . . . .	6	18	22	38.230	+ 108.267	- 89 16 31.47	1.97
1 Aquilæ (3 H. Scuti) . . . . .	4.5	18	28	37.284	+ 3.264	- 8 19 36.56	2.19
$\alpha$ Lyræ ( <i>Vega</i> ) . . . . .	1	18	32	50.496	+ 2.032	+ 38 40 19.21	3.15
$\beta$ Lyræ . . . . .	var.	18	45	36.740	+ 2.215	+ 33 13 23.53	+ 3.96
$\sigma$ Sagittarii . . . . .	2.3	18	47	45.732	+ 3.723	- 26 26 41.57	4.09
$\zeta$ Draconis . . . . .	6	18	50	16.015	- 1.902	+ 75 17 24.19	4.42
$\zeta$ Aquilæ . . . . .	3	18	59	50.824	+ 2.755	+ 13 41 6.47	5.10
$d$ Sagittarii . . . . .	5	19	10	33.258	+ 3.513	- 19 9 56.17	+ 6.11

\* Circumpolar Stars.



MEAN PLACES FOR 1879.0. (Jan. 0 + <sup>a</sup>.016, Washington.)

Star's Name.	Magnitude.	Right Ascension.			An. Variation.	Declination.			An. Variation.
		h	m	s		°	'	"	
* δ Draconis . . . .	3	19	12	31.402	+ 0.032	+ 67	26	54.60	+ 6.31
* τ Draconis . . . .	5	19	17	52.277	- 1.112	+ 73	7	48.51	6.78
δ Aquilæ . . . .	3.4	19	19	23.779	+ 3.025	+ 2	52	30.54	6.91
κ Aquilæ . . . .	5	19	30	22.843	+ 3.230	- 7	17	40.29	7.73
γ Aquilæ . . . .	3	19	40	30.408	+ 2.853	+ 10	19	11.11	8.52
α Aquilæ ( <i>Altair</i> ) . .	1.2	19	44	52.741	+ 2.928	+ 8	33	0.40	+ 9.24
* λ Ursæ Minoris . .	6.7	19	45	12.747	- 61.841	+ 88	56	27.08	8.89
* ε Draconis . . . .	4	19	48	34.403	- 0.175	+ 69	57	33.56	9.15
β Aquilæ . . . .	4	19	49	22.138	+ 2.947	+ 6	6	21.42	8.74
τ Aquilæ . . . .	6.5	19	58	13.783	+ 2.933	+ 6	56	16.52	9.91
α <sup>3</sup> Capricorni . . . .	3.4	20	11	20.366	+ 3.333	- 12	55	6.20	+ 10.89
* κ Cephei . . . .	4.5	20	12	56.023	- 1.907	+ 77	20	45.13	10.99
α Pavonis . . . .	2	20	16	4.322	+ 4.791	- 57	7	13.13	11.19
π Capricorni . . . .	5	20	20	23.627	+ 3.441	- 18	36	24.46	11.50
ε Delphini . . . .	4	20	27	25.885	+ 2.865	+ 10	53	35.61	12.01
* Groombridge 3241 . .	6.7	20	30	31.043	- 0.213	+ 72	7	18.21	+ 12.22
α Cygni . . . .	2.1	20	37	18.412	+ 2.044	+ 44	50	54.98	12.71
μ Aquarii . . . .	5.4	20	46	7.535	+ 3.240	- 9	26	9.01	13.28
ν Cygni . . . .	4	20	52	39.718	+ 2.234	+ 40	42	8.74	13.73
* 12 Year Cat. 1879 . .	6	20	53	1.520	- 2.516	+ 80	5	50.31	13.69
61 Cygni ( <i>pr.</i> ) . . .	5.6	21	1	28.485	+ 2.688	+ 38	9	19.31	+ 17.53
ζ Cygni . . . .	3	21	7	47.180	2.550	+ 29	43	53.36	14.60
α Cephei . . . .	3.2	21	15	41.451	1.437	+ 62	4	22.01	15.12
1 Pegasi . . . .	4.5	21	16	29.506	2.774	+ 19	17	16.97	15.25
β Aquarii . . . .	3	21	25	11.309	3.164	- 6	6	8.08	15.66
* β Cephei . . . .	3	21	27	5.552	+ 0.797	+ 70	1	45.49	+ 15.71
ξ Aquarii . . . .	5.4	21	31	18.550	3.197	- 8	23	44.64	15.96
* ε Pegasi . . . .	2.3	21	38	14.611	2.948	+ 9	19	16.40	16.35
* 11 Cephei . . . .	5	21	40	8.702	0.904	+ 70	45	15.06	16.51
μ Capricorni . . . .	5	21	46	41.888	3.279	- 14	7	12.00	16.79
* 79 Draconis . . . .	6.7	21	51	21.590	+ 0.734	+ 73	7	47.09	+ 16.96
α Aquarii . . . .	3	21	59	34.114	3.084	- 0	54	24.63	17.35
α Gruis . . . .	2	22	0	36.058	3.810	- 47	32	45.18	17.22
θ Aquarii . . . .	4.5	22	10	26.871	3.170	- 8	23	5.90	17.80
π Aquarii . . . .	5.4	22	19	5.831	3.065	+ 0	45	50.67	18.14
η Aquarii . . . .	4.3	22	29	8.269	+ 3.063	- 0	44	25.73	+ 18.45
* 226 Cephei (B.) . . .	5.6	22	30	8.668	1.081	+ 75	36	9.98	18.52
ζ Pegasi . . . .	3.4	22	35	25.568	2.989	+ 10	12	1.80	18.71
* ι Cephei . . . .	4.3	22	45	22.473	2.120	+ 65	33	50.75	18.86
λ Aquarii . . . .	4	22	46	18.002	3.131	- 8	13	21.81	19.08
α Pis. Aus. ( <i>Fomalhaut</i> )	1.2	22	50	57.690	+ 3.327	- 30	15	46.24	+ 18.99
α Pegasi ( <i>Markab</i> ) . .	2	22	58	44.042	2.985	+ 14	33	17.58	19.32
* ο Cephei . . . .	6.5	23	13	39.805	2.440	+ 67	26	57.15	19.63
θ Piscium . . . .	4.5	23	21	49.785	3.041	+ 5	42	53.67	19.75
ι Piscium . . . .	4.5	23	33	43.667	3.085	+ 4	58	14.82	19.49
* γ Cephei . . . .	3.4	23	34	23.436	+ 2.406	+ 76	57	25.45	+ 20.07
* Groombridge 4163 . .	7	23	48	57.742	2.857	+ 73	44	12.28	20.00
ω Piscium . . . .	4	23	53	65.910	+ 3.078	+ 6	11	37.11	+ 19.94

\* Circumpolar Stars.

## APPARENT PLACES OF $\alpha$ URSÆ MINORIS, (*Polaris*), FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	JANUARY.		Mean Solar Date.	FEBRUARY.		Mean Solar Date.	MARCH.		Mean Solar Date.	APRIL.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 1 14	+88° 40'		<sup>h</sup> <sup>m</sup> 1 13	+88° 40'		<sup>h</sup> <sup>m</sup> 1 13	+88° 40'		<sup>h</sup> <sup>m</sup> 1 13	+88° 39'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
0.3	26.84	17.0	1.2	58.74	17.2	1.1	38.39	12.3	1.0	28.55	63.5
1.3	26.01	17.1	2.2	57.95	17.1	2.1	37.87	12.1	2.0	28.40	63.2
2.3	25.22	17.2	3.2	57.13	17.0	3.1	37.31	11.9	3.0	28.27	62.9
3.3	24.45	17.2	4.2	56.26	16.9	4.1	36.73	11.6	4.0	28.18	62.6
4.3	23.67	17.3	5.2	55.35	16.8	5.1	36.13	11.4	5.0	28.15	62.2
5.3	22.86	17.4	6.2	54.42	16.7	6.1	35.53	11.2	6.0	28.18	61.9
6.3	22.02	17.5	7.2	53.50	16.6	7.1	34.95	10.9	7.0	28.28	61.6
7.2	21.13	17.6	8.2	52.60	16.5	8.1	34.42	10.6	8.0	28.44	61.2
8.2	20.18	17.7	9.2	51.75	16.3	9.1	33.94	10.3	9.0	28.64	60.9
9.2	19.19	17.8	10.2	50.95	16.1	10.1	33.53	10.0	10.0	28.85	60.6
10.2	18.18	17.9	11.2	50.21	15.9	11.1	33.19	9.7	11.0	29.06	60.3
11.2	17.17	17.9	12.2	49.53	15.8	12.1	32.89	9.4	12.0	29.24	60.1
12.2	16.19	17.9	13.1	48.89	15.6	13.1	32.62	9.1	13.0	29.39	59.8
13.2	15.25	17.9	14.1	48.25	15.4	14.1	32.36	8.8	14.0	29.51	59.5
14.2	14.36	17.9	15.1	47.60	15.3	15.1	32.08	8.6	15.0	29.60	59.2
15.2	13.52	17.9	16.1	46.92	15.1	16.1	31.78	8.3	16.0	29.69	58.9
16.2	12.71	17.9	17.1	46.21	15.0	17.1	31.44	8.0	17.0	29.79	58.6
17.2	11.92	17.9	18.1	45.45	14.8	18.1	31.07	7.8	18.0	29.94	58.3
18.2	11.13	17.9	19.1	44.66	14.6	19.1	30.68	7.5	19.0	30.16	58.0
19.2	10.32	17.9	20.1	43.85	14.5	20.1	30.30	7.2	20.0	30.45	57.6
20.2	9.46	18.0	21.1	43.05	14.3	21.1	29.94	6.9	21.0	30.80	57.3
21.2	8.54	18.0	22.1	42.30	14.0	22.0	29.63	6.6	22.0	31.19	57.0
22.2	7.58	18.0	23.1	41.61	13.8	23.0	29.39	6.2	23.0	31.61	56.7
23.2	6.58	17.9	24.1	40.97	13.5	24.0	29.21	5.9	24.0	32.05	56.4
24.2	5.57	17.9	25.1	40.38	13.2	25.0	29.10	5.5	25.0	32.47	56.2
25.2	4.58	17.9	26.1	39.85	13.0	26.0	29.04	5.2	25.9	32.87	55.9
26.2	3.62	17.8	27.1	39.36	12.7	27.0	29.00	4.9	26.9	33.23	55.7
27.2	2.71	17.6	28.1	39.88	12.5	28.0	28.95	4.6	27.9	33.57	55.4
28.2	1.85	17.5	29.1	38.39	12.3	29.0	28.88	4.3	28.9	33.90	55.2
29.2	1.03	17.4	30.1	37.87	12.1	30.0	28.79	4.1	29.9	34.23	54.9
30.2	0.25	17.3	31.1	37.31	11.9	31.0	28.68	3.8	30.9	34.58	54.6
31.2	59.50	17.2	32.1	36.73	11.6	32.0	28.55	3.5	31.9	34.97	54.3

APPARENT PLACES OF  $\alpha$  URSÆ MINORIS, (*Polaris*), FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	MAY.		Mean Solar Date.	JUNE.		Mean Solar Date.	JULY.		Mean Solar Date.	AUGUST.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 1 13	+88° 39'		<sup>h</sup> <sup>m</sup> 1 13	+88° 39'		<sup>h</sup> <sup>m</sup> 1 14	+88° 39'		<sup>h</sup> <sup>m</sup> 1 14	+88° 39'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.9	34.97	54.3	1.9	55.82	48.0	1.8	23.57	46.4	1.7	52.75	50.2
2.9	35.42	54.1	2.8	56.77	47.8	2.8	24.60	46.5	2.7	53.53	50.4
3.9	35.95	53.8	3.8	57.72	47.7	3.8	25.57	46.6	3.7	54.29	50.6
4.9	36.55	53.5	4.8	58.66	47.6	4.8	26.49	46.7	4.7	55.05	50.7
5.9	37.18	53.2	5.8	59.56	47.6	5.8	27.37	46.7	5.7	55.84	50.8
6.9	37.83	53.0	6.8	60.41	47.5	6.8	28.23	46.8	6.7	56.68	51.0
7.9	38.47	52.8	7.8	61.21	47.4	7.8	29.08	46.8	7.7	57.57	51.1
8.9	39.09	52.6	8.8	61.99	47.3	8.7	29.95	46.9	8.7	58.49	51.3
9.9	39.69	52.4	9.8	62.76	47.2	9.7	30.87	46.9	9.7	59.43	51.6
10.9	40.26	52.2	10.8	63.54	47.1	10.7	31.83	47.0	10.7	60.37	51.9
11.9	40.77	51.9	11.8	64.35	47.0	11.7	32.84	47.1	11.7	61.38	52.1
12.9	41.27	51.7	12.8	65.21	46.9	12.7	33.88	47.2	12.7	62.15	52.4
13.9	41.79	51.5	13.8	66.14	46.8	13.7	34.94	47.3	13.7	62.96	52.6
14.9	42.33	51.3	14.8	67.12	46.7	14.7	36.00	47.3	14.6	63.72	52.9
15.9	42.92	51.0	15.8	68.14	46.6	15.7	37.03	47.4	15.6	64.43	53.1
16.9	43.57	50.8	16.8	69.17	46.5	16.7	38.01	47.5	16.6	65.11	53.4
17.9	44.28	50.5	17.8	70.19	46.5	17.7	38.95	47.6	17.6	65.78	53.6
18.9	45.05	50.3	18.8	71.19	46.5	18.7	39.84	47.8	18.6	66.46	53.9
19.9	45.85	50.1	19.8	72.14	46.5	19.7	40.69	47.9	19.6	67.18	54.1
20.9	46.66	49.9	20.8	73.04	46.5	20.7	41.52	48.1	20.6	67.94	54.4
21.9	47.47	49.7	21.8	73.90	46.5	21.7	42.36	48.2	21.6	68.74	54.6
22.9	48.25	49.5	22.8	74.74	46.5	22.7	43.22	48.3	22.6	69.56	54.9
23.9	48.99	49.4	23.8	75.59	46.4	23.7	44.12	48.4	23.6	70.40	55.2
24.9	49.69	49.3	24.8	76.46	46.4	24.7	45.07	48.6	24.6	71.24	55.5
25.9	50.36	49.1	25.8	77.36	46.4	25.7	46.07	48.7	25.6	72.04	55.8
26.9	51.03	49.0	26.8	78.31	46.4	26.7	47.10	48.8	26.6	72.79	56.1
27.9	51.71	48.8	27.8	79.39	46.3	27.7	48.13	49.0	27.6	73.48	56.4
28.9	52.42	48.6	28.8	80.37	46.3	28.7	49.14	49.2	28.6	74.10	56.7
29.9	53.18	48.4	29.8	81.44	46.3	29.7	50.12	49.4	29.6	74.68	57.1
30.9	54.00	48.3	30.8	82.51	46.4	30.7	51.06	49.7	30.6	75.23	57.4
31.9	54.89	48.1	31.8	83.57	46.4	31.7	51.93	49.9	31.6	75.76	57.7
32.9	55.82	48.0	32.8	84.60	46.5	32.7	52.75	50.2	32.6	76.31	58.0

## APPARENT PLACES OF $\alpha$ URSÆ MINORIS, (*Polaris*), FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	SEPTEMBER.		Mean Solar Date.	OCTOBER.		Mean Solar Date.	NOVEMBER.		Mean Solar Date.	DECEMBER.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 1 15	+88° 39'		<sup>h</sup> <sup>m</sup> 1 15	+88° 40'		<sup>h</sup> <sup>m</sup> 1 15	+88° 40'		<sup>h</sup> <sup>m</sup> 1 14	+88° 40'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.6	16.31	58.0	1.5	30.11	8.4	1.4	31.97	20.1	1.3	80.27	30.1
2.6	16.90	58.2	2.5	30.45	8.7	2.4	31.85	20.5	2.3	79.61	30.4
3.6	17.53	58.5	3.5	30.80	9.1	3.4	31.67	20.9	3.3	78.91	30.7
4.6	18.19	58.8	4.5	31.14	9.5	4.4	31.41	21.3	4.3	78.18	30.9
5.6	18.88	59.1	5.5	31.45	9.9	5.4	31.10	21.7	5.3	77.44	31.2
6.6	19.57	59.4	6.5	31.70	10.3	6.4	30.75	22.1	6.3	76.72	31.4
7.6	20.24	59.7	7.5	31.89	10.7	7.4	30.39	22.5	7.3	76.03	31.7
8.6	20.88	60.1	8.5	32.02	11.1	8.4	30.03	22.8	8.3	75.38	31.9
9.6	21.46	60.5	9.5	32.10	11.5	9.4	29.69	23.1	9.3	74.77	32.1
10.6	21.97	60.8	10.5	32.14	11.9	10.4	29.38	23.4	10.3	74.18	32.3
11.6	22.43	61.2	11.5	32.16	12.3	11.4	29.11	23.7	11.3	73.59	32.5
12.6	22.85	61.6	12.5	32.20	12.7	12.4	28.87	24.1	12.3	72.99	32.8
13.6	23.24	61.9	13.5	32.28	13.0	13.4	28.63	24.4	13.3	72.34	33.0
14.6	23.64	62.3	14.5	32.39	13.4	14.4	28.38	24.7	14.3	71.63	33.3
15.6	24.06	62.6	15.5	32.53	13.7	15.4	28.10	25.1	15.3	70.86	33.6
16.6	24.51	62.9	16.5	32.70	14.1	16.4	27.77	25.5	16.3	70.04	33.8
17.6	25.00	63.2	17.5	32.88	14.5	17.4	27.38	25.9	17.3	69.18	34.0
18.6	25.53	63.6	18.5	33.02	14.9	18.4	26.93	26.2	18.3	68.29	34.2
19.5	26.08	63.9	19.5	33.12	15.3	19.4	26.41	26.6	19.3	67.40	34.4
20.5	26.62	64.3	20.5	33.16	15.7	20.4	25.85	26.9	20.3	66.54	34.5
21.5	27.12	64.7	21.5	33.14	16.1	21.4	25.28	27.2	21.3	65.72	34.6
22.5	27.58	65.1	22.5	33.06	16.5	22.4	24.72	27.5	22.3	64.95	34.8
23.5	27.99	65.5	23.5	32.93	16.9	23.4	24.19	27.8	23.3	64.21	34.9
24.5	28.33	65.9	24.5	32.77	17.3	24.4	23.69	28.0	24.3	63.48	35.0
25.5	28.61	66.3	25.5	32.59	17.7	25.4	23.23	28.3	25.3	62.75	35.2
26.5	28.85	66.7	26.4	32.43	18.0	26.4	22.79	28.5	26.3	62.00	35.3
27.5	29.06	67.0	27.4	32.30	18.3	27.4	22.35	28.8	27.3	61.21	35.5
28.5	29.27	67.4	28.4	32.21	18.7	28.4	21.90	29.1	28.3	60.37	35.7
29.5	29.51	67.7	29.4	32.15	19.0	29.4	21.42	29.5	29.3	59.47	35.8
30.5	29.79	68.1	30.4	32.10	19.4	30.4	20.88	29.8	30.3	58.53	36.0
31.5	30.11	68.4	31.4	32.05	19.7	31.3	20.27	30.1	31.3	57.56	36.1
32.5	30.45	68.7	32.4	31.97	20.1	32.3	19.61	30.4	32.3	56.59	36.2

APPARENT PLACES OF 51 CEPHEI, (*Hev.*) FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	JANUARY.		Mean Solar Date.	FEBRUARY.		Mean Solar Date.	MARCH.		Mean Solar Date.	APRIL.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 6 43	+87° 13'		<sup>h</sup> <sup>m</sup> 6 43	+87° 14'		<sup>h</sup> <sup>m</sup> 6 43	+87° 14'		<sup>h</sup> <sup>m</sup> 6 43	+87° 14'
0.5	<sup>s</sup> 53.19	52.8	1.4	<sup>s</sup> 52.05	52.4	1.3	<sup>s</sup> 44.34	8.7	1.2	<sup>s</sup> 31.85	11.1
1.5	53.25	53.1	2.4	51.92	52.7	2.3	44.02	8.9	2.2	31.43	11.1
2.5	53.32	53.4	3.4	51.78	53.0	3.3	43.70	9.1	3.2	30.99	11.1
3.5	53.40	53.7	4.4	51.63	53.3	4.3	43.37	9.2	4.2	30.53	11.1
4.5	53.50	53.9	5.4	51.46	53.6	5.3	43.02	9.4	5.2	30.06	11.0
5.5	53.61	54.2	6.4	51.26	53.9	6.3	42.64	9.6	6.2	29.60	11.0
6.5	53.72	54.5	7.4	51.03	54.2	7.3	42.22	9.8	7.2	29.15	10.9
7.5	53.82	54.8	8.4	50.77	54.5	8.3	41.78	9.9	8.2	28.72	10.8
8.5	53.90	55.2	9.4	50.49	54.7	9.3	41.34	10.0	9.2	28.32	10.7
9.5	53.96	55.5	10.4	50.20	54.9	10.3	40.91	10.1	10.2	27.94	10.6
10.5	53.99	55.9	11.4	49.92	55.2	11.3	40.48	10.2	11.2	27.58	10.5
11.5	53.98	56.2	12.4	49.65	55.4	12.3	40.07	10.3	12.2	27.24	10.4
12.5	53.95	56.6	13.4	49.39	55.6	13.3	39.68	10.3	13.2	26.89	10.3
13.5	53.90	56.9	14.4	49.15	55.8	14.3	39.31	10.4	14.2	26.53	10.2
14.5	53.84	57.2	15.4	48.93	56.0	15.3	38.96	10.5	15.2	26.15	10.2
15.4	53.79	57.5	16.4	48.71	56.3	16.3	38.61	10.6	16.2	25.75	10.1
16.4	53.75	57.7	17.4	48.47	56.5	17.3	38.25	10.6	17.2	25.33	10.0
17.4	53.73	58.0	18.4	48.21	56.7	18.3	37.87	10.7	18.2	24.89	9.9
18.4	53.72	58.3	19.4	47.93	56.9	19.3	37.46	10.8	19.2	24.44	9.8
19.4	53.71	58.6	20.4	47.61	57.2	20.3	37.01	10.9	20.2	24.00	9.7
20.4	53.70	58.9	21.4	47.26	57.4	21.3	36.54	11.0	21.2	23.58	9.5
21.4	53.68	59.2	22.3	46.89	57.7	22.3	36.06	11.1	22.2	23.18	9.3
22.4	53.63	59.5	23.3	46.50	57.9	23.3	35.57	11.1	23.2	22.81	9.1
23.4	53.55	59.9	24.3	46.11	58.0	24.3	35.09	11.1	24.2	22.47	9.0
24.4	53.43	60.2	25.3	45.73	58.2	25.3	34.62	11.1	25.2	22.16	8.8
25.4	53.28	60.6	26.3	45.35	58.3	26.3	34.18	11.1	26.2	21.86	8.6
26.4	53.10	60.9	27.3	44.99	58.5	27.3	33.77	11.1	27.2	21.55	8.5
27.4	52.91	61.2	28.3	44.66	58.6	28.3	33.38	11.0	28.2	21.23	8.4
28.4	52.72	61.4	29.3	44.34	58.7	29.3	33.00	11.0	29.2	20.90	8.2
29.4	52.53	61.7	30.3	44.02	58.9	30.3	32.63	11.0	30.2	20.55	8.1
30.4	52.35	61.9	31.3	43.70	59.1	31.2	32.25	11.0	31.2	20.19	7.9
31.4	52.19	62.2	32.3	43.37	59.2	32.2	31.85	11.1	32.2	19.82	7.7

APPARENT PLACES OF 51 CEPHEI, (*Hec.*) FOR THE UPPER TRANSIT

AT WASHINGTON.

Mean Solar Date.	MAY.		Mean Solar Date.	JUNE.		Mean Solar Date.	JULY.		Mean Solar Date.	AUGUST.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 6 43	<sup>°</sup> <sup>'</sup> +87 14		<sup>h</sup> <sup>m</sup> 6 43	<sup>°</sup> <sup>'</sup> +87 13		<sup>h</sup> <sup>m</sup> 6 43	<sup>°</sup> <sup>'</sup> +87 13		<sup>h</sup> <sup>m</sup> 6 43	<sup>°</sup> <sup>'</sup> +87 13
1.2	<sup>s</sup> 20.19	<sup>"</sup> 7.9	1.1	<sup>s</sup> 12.74	<sup>"</sup> 60.2	1.0	<sup>s</sup> 12.42	<sup>"</sup> 50.7	1.9	<sup>s</sup> 19.65	<sup>"</sup> 41.1
2.2	19.82	7.7	2.1	12.61	59.9	2.0	12.57	50.4	2.9	19.98	40.8
3.2	19.45	7.5	3.1	12.51	59.6	3.0	12.74	50.0	3.9	20.29	40.6
4.2	19.10	7.3	4.1	12.44	59.2	4.0	12.92	49.7	4.9	20.59	40.3
5.1	18.77	7.1	5.1	12.39	58.9	5.0	13.10	49.4	5.9	20.88	40.1
6.1	18.46	6.8	6.1	12.35	58.6	6.0	13.27	49.1	6.9	21.17	39.8
7.1	18.18	6.6	7.1	12.32	58.3	7.0	13.41	48.9	7.9	21.47	39.6
8.1	17.93	6.4	8.1	12.28	58.0	8.0	13.53	48.6	8.9	21.79	39.3
9.1	17.70	6.1	9.1	12.22	57.7	9.0	13.64	48.3	9.9	22.15	39.0
10.1	17.48	5.9	10.1	12.14	57.5	10.0	13.75	48.0	10.9	22.54	38.7
11.1	17.25	5.7	11.1	12.05	57.2	11.0	13.87	47.7	11.9	22.95	38.4
12.1	17.00	5.5	12.0	11.95	56.9	12.0	14.00	47.3	12.9	23.38	38.2
13.1	16.73	5.3	13.0	11.85	56.6	13.0	14.16	47.0	13.9	23.82	38.0
14.1	16.45	5.1	14.0	11.76	56.3	14.0	14.35	46.6	14.9	24.26	37.7
15.1	16.16	4.9	15.0	11.69	55.9	15.0	14.57	46.3	15.9	24.69	37.5
16.1	15.86	4.6	16.0	11.65	55.6	16.0	14.82	46.0	16.9	25.10	37.4
17.1	15.56	4.4	17.0	11.65	55.2	17.0	15.08	45.7	17.9	25.49	37.2
18.1	15.27	4.1	18.0	11.68	54.9	18.0	15.35	45.4	18.9	25.86	37.0
19.1	15.01	3.8	19.0	11.73	54.5	18.9	15.62	45.1	19.9	26.23	36.7
20.1	14.78	3.5	20.0	11.81	54.2	19.9	15.88	44.8	20.9	26.61	36.5
21.1	14.58	3.2	21.0	11.88	53.9	20.9	16.12	44.6	21.9	27.01	36.3
22.1	14.41	2.9	22.0	11.94	53.6	21.9	16.34	44.3	22.8	27.43	36.0
23.1	14.26	2.6	23.0	11.98	53.3	22.9	16.55	44.0	23.8	27.88	35.8
24.1	14.12	2.4	24.0	12.01	53.1	23.9	16.76	43.7	24.8	28.36	35.5
25.1	13.98	2.1	25.0	12.03	52.8	24.9	16.99	43.4	25.8	28.85	35.3
26.1	13.83	1.9	26.0	12.05	52.5	25.9	17.25	43.1	26.8	29.36	35.1
27.1	13.66	1.7	27.0	12.08	52.1	26.9	17.54	42.8	27.8	29.87	34.9
28.1	13.47	1.4	28.0	12.12	51.8	27.9	17.85	42.5	28.8	30.37	34.8
29.1	13.27	1.1	29.0	12.19	51.4	28.9	18.19	42.1	29.8	30.86	34.6
30.1	13.08	0.8	30.0	12.29	51.1	29.9	18.55	41.8	30.8	31.33	34.5
31.1	12.90	0.5	31.0	12.42	50.7	30.9	18.93	41.6	31.8	31.77	34.4
32.1	12.74	0.2	32.0	12.57	50.4	31.9	19.30	41.3	32.8	32.18	34.2

APPARENT PLACES OF 51 CEPHEI, (*Hev.*) FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	SEPTEMBER.		Mean Solar Date.	OCTOBER.		Mean Solar Date.	NOVEMBER.		Mean Solar Date.	DECEMBER.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 6 43	+87° 13'		<sup>h</sup> <sup>m</sup> 6 43	+87° 13'		<sup>h</sup> <sup>m</sup> 6 44	+87° 13'		<sup>h</sup> <sup>m</sup> 6 44	+87° 13'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.8	32.18	34.2	1.7	47.50	31.0	1.7	3.88	32.0	1.6	17.08	37.3
2.8	32.58	34.0	2.7	48.00	30.9	2.7	4.42	32.1	2.6	17.46	37.6
3.8	33.00	33.9	3.7	48.53	30.8	3.7	4.96	32.2	3.6	17.82	37.9
4.8	33.45	33.7	4.7	49.08	30.8	4.7	5.50	32.3	4.6	18.15	38.2
5.8	33.92	33.5	5.7	49.66	30.7	5.6	6.02	32.5	5.6	18.45	38.5
6.8	34.41	33.3	6.7	50.26	30.7	6.6	6.51	32.6	6.6	18.72	38.7
7.8	34.93	33.1	7.7	50.85	30.7	7.6	6.97	32.8	7.6	18.98	39.0
8.8	35.47	32.9	8.7	51.43	30.7	8.6	7.41	33.0	8.6	19.25	39.2
9.8	36.03	32.8	9.7	51.99	30.8	9.6	7.84	33.2	9.6	19.53	39.5
10.8	36.58	32.7	10.7	52.53	30.8	10.6	8.26	33.3	10.5	19.82	39.7
11.8	37.11	32.6	11.7	53.04	30.8	11.6	8.69	33.4	11.5	20.13	39.9
12.8	37.63	32.5	12.7	53.53	30.9	12.6	9.13	33.5	12.5	20.45	40.2
13.8	38.13	32.4	13.7	54.02	30.9	13.6	9.60	33.7	13.5	20.78	40.4
14.8	38.61	32.3	14.7	54.51	30.9	14.6	10.08	33.8	14.5	21.10	40.7
15.8	39.08	32.2	15.7	55.02	30.9	15.6	10.58	33.9	15.5	21.41	41.0
16.8	39.55	32.1	16.7	55.54	30.9	16.6	11.09	34.1	16.5	21.69	41.3
17.8	40.03	32.0	17.7	56.09	30.9	17.6	11.59	34.3	17.5	21.94	41.6
18.8	40.54	31.9	18.7	56.67	30.9	18.6	12.08	34.5	18.5	22.15	42.0
19.8	41.07	31.7	19.7	57.26	30.9	19.6	12.55	34.7	19.5	22.32	42.3
20.8	41.62	31.6	20.7	57.84	30.9	20.6	12.98	35.0	20.5	22.47	42.6
21.8	42.19	31.5	21.7	58.42	31.0	21.6	13.37	35.2	21.5	22.61	42.9
22.8	42.78	31.4	22.7	58.99	31.1	22.6	13.72	35.4	22.5	22.76	43.2
23.8	43.37	31.3	23.7	59.53	31.2	23.6	14.05	35.7	23.5	22.91	43.4
24.8	43.95	31.3	24.7	60.04	31.3	24.6	14.37	35.9	24.5	23.07	43.7
25.8	44.52	31.2	25.7	60.52	31.4	25.6	14.71	36.0	25.5	23.25	44.0
26.8	45.06	31.2	26.7	60.98	31.5	26.6	15.07	36.2	26.5	23.44	44.2
27.7	45.57	31.2	27.7	61.44	31.6	27.6	15.45	36.4	27.5	23.63	44.5
28.7	46.06	31.1	28.7	61.89	31.7	28.6	15.84	36.6	28.5	23.83	44.8
29.7	46.53	31.1	29.7	62.35	31.7	29.6	16.25	36.8	29.5	24.01	45.2
30.7	47.01	31.1	30.7	62.84	31.8	30.6	16.67	37.1	30.5	24.15	45.5
31.7	47.50	31.0	31.7	63.35	31.9	31.6	17.08	37.3	31.5	24.27	45.9
32.7	48.00	30.9	32.7	63.88	32.0	32.6	17.46	37.6	32.5	24.35	46.2

APPARENT PLACES OF  $\delta$  URSÆ MINORIS, FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	JANUARY.		Mean Solar Date.	FEBRUARY.		Mean Solar Date.	MARCH.		Mean Solar Date.	APRIL.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
	<sup>h</sup> 18 10	<sup>m</sup> +86° 36'		<sup>h</sup> 18 10	<sup>m</sup> +86° 36'		<sup>h</sup> 18 11	<sup>m</sup> +86° 36'		<sup>h</sup> 18 11	<sup>m</sup> +86° 36'
1.0	<sup>s</sup> 53.02	24.5	1.9	<sup>s</sup> 56.22	14.7	1.8	<sup>s</sup> 3.96	9.1	1.7	<sup>s</sup> 14.77	8.2
2.0	53.03	24.2	2.9	56.41	14.5	2.8	4.26	9.0	2.7	15.12	8.2
3.0	53.04	23.9	3.9	56.59	14.2	3.8	4.56	8.8	3.7	15.48	8.2
4.0	53.04	23.6	4.9	56.78	13.9	4.8	4.88	8.7	4.7	15.85	8.3
5.0	53.04	23.3	5.9	56.99	13.6	5.8	5.22	8.5	5.7	16.23	8.4
6.0	53.02	23.0	6.9	57.23	13.3	6.8	5.58	8.4	6.7	16.60	8.5
7.0	53.00	22.7	7.9	57.49	13.0	7.8	5.96	8.3	7.7	16.95	8.7
8.0	53.00	22.3	8.9	57.77	12.8	8.8	6.33	8.2	8.7	17.28	8.8
9.0	53.02	22.0	9.9	58.05	12.6	9.8	6.71	8.1	9.7	17.59	9.0
10.0	53.07	21.6	10.9	58.32	12.3	10.8	7.08	8.1	10.7	17.89	9.1
11.0	53.14	21.2	11.9	58.59	12.1	11.8	7.43	8.1	11.7	18.19	9.3
11.9	53.22	20.9	12.9	58.86	12.0	12.8	7.77	8.0	12.7	18.48	9.4
12.9	53.31	20.5	13.9	59.12	11.8	13.8	8.10	8.0	13.7	18.77	9.5
13.9	53.41	20.2	14.9	59.37	11.6	14.8	8.42	8.0	14.7	19.08	9.6
14.9	53.52	19.9	15.9	59.61	11.4	15.8	8.74	8.0	15.7	19.40	9.7
15.9	53.63	19.6	16.9	59.86	11.2	16.8	9.06	7.9	16.7	19.73	9.8
16.9	53.73	19.3	17.8	60.12	11.0	17.8	9.39	7.9	17.7	20.07	10.0
17.9	53.82	19.0	18.8	60.39	10.8	18.8	9.74	7.8	18.7	20.42	10.1
18.9	53.90	18.6	19.8	60.68	10.5	19.8	10.11	7.7	19.7	20.76	10.3
19.9	53.98	18.3	20.8	60.99	10.3	20.8	10.49	7.7	20.7	21.09	10.5
20.9	54.07	18.0	21.8	61.32	10.1	21.8	10.88	7.7	21.7	21.40	10.7
21.9	54.17	17.7	22.8	61.67	9.9	22.8	11.28	7.7	22.7	21.70	11.0
22.9	54.30	17.5	23.8	62.02	9.8	23.8	11.68	7.7	23.7	21.98	11.2
23.9	54.46	17.2	24.8	62.37	9.6	24.8	12.07	7.8	24.7	22.24	11.4
24.9	54.64	17.0	25.8	62.71	9.5	25.7	12.44	7.8	25.7	22.48	11.6
25.9	54.84	16.7	26.8	63.04	9.4	26.7	12.79	7.9	26.7	22.72	11.8
26.9	55.05	16.4	27.8	63.36	9.3	27.7	13.13	8.0	27.7	22.97	12.0
27.9	55.26	16.1	28.8	63.66	9.3	28.7	13.45	8.0	28.7	23.23	12.2
28.9	55.47	15.8	29.8	63.96	9.1	29.7	13.77	8.1	29.7	23.49	12.3
29.9	55.67	15.5	30.8	64.26	9.0	30.7	14.10	8.1	30.7	23.76	12.5
30.9	55.86	15.2	31.8	64.56	8.8	31.7	14.43	8.1	31.6	24.04	12.7
31.9	56.04	15.0	32.8	64.86	8.7	32.7	14.77	8.2	32.6	24.32	13.0



APPARENT PLACES OF  $\delta$  URSÆ MINORIS, FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	MAY.		Mean Solar Date.	JUNE.		Mean Solar Date.	JULY.		Mean Solar Date.	AUGUST.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sub>18</sub> <sup>m</sup> <sub>11</sub>	+86° 36'		<sup>h</sup> <sub>18</sub> <sup>m</sup> <sub>11</sub>	+86° 36'		<sup>h</sup> <sub>18</sub> <sup>m</sup> <sub>11</sub>	+86° 36'		<sup>h</sup> <sub>18</sub> <sup>m</sup> <sub>11</sub>	+86° 36'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.6	24.04	12.7	1.6	29.23	21.6	1.5	28.50	31.5	1.4	21.95	40.5
2.6	24.32	13.0	2.6	29.30	21.9	2.5	28.34	31.8	2.4	21.66	40.7
3.6	24.59	13.2	3.6	29.34	22.3	3.5	28.17	32.1	3.4	21.38	40.9
4.6	24.84	13.5	4.6	29.37	22.6	4.5	28.01	32.4	4.4	21.10	41.1
5.6	25.07	13.8	5.6	29.39	23.0	5.5	27.85	32.7	5.4	20.83	41.3
6.6	25.28	14.1	6.6	29.39	23.3	6.5	27.70	33.0	6.4	20.56	41.6
7.6	25.48	14.4	7.6	29.40	23.6	7.5	27.56	33.2	7.4	20.28	41.8
8.6	25.67	14.6	8.5	29.42	23.9	8.5	27.43	33.5	8.4	19.99	42.1
9.6	25.84	14.9	9.5	29.45	24.1	9.5	27.31	33.8	9.4	19.69	42.3
10.6	26.01	15.1	10.5	29.49	24.4	10.5	27.18	34.1	10.4	19.37	42.6
11.6	26.19	15.4	11.5	29.53	24.7	11.5	27.04	34.5	11.4	19.02	42.8
12.6	26.38	15.6	12.5	29.58	25.1	12.5	26.88	34.8	12.4	18.65	43.1
13.6	26.58	15.8	13.5	29.62	25.4	13.4	26.70	35.2	13.4	18.27	43.3
14.6	26.79	16.1	14.5	29.65	25.8	14.4	26.50	35.5	14.4	17.90	43.5
15.6	27.01	16.3	15.5	29.65	26.1	15.4	26.28	35.8	15.4	17.54	43.6
16.6	27.22	16.6	16.5	29.62	26.5	16.4	26.05	36.1	16.4	17.18	43.8
17.6	27.42	16.9	17.5	29.58	26.9	17.4	25.81	36.4	17.4	16.83	44.0
18.6	27.60	17.3	18.5	29.52	27.2	18.4	25.56	36.7	18.3	16.50	44.1
19.6	27.77	17.6	19.5	29.45	27.6	19.4	25.32	36.9	19.3	16.17	44.3
20.6	27.91	17.9	20.5	29.37	27.9	20.4	25.09	37.2	20.3	15.84	44.5
21.6	28.03	18.3	21.5	29.30	28.2	21.4	24.87	37.4	21.3	15.50	44.7
22.6	28.14	18.6	22.5	29.23	28.5	22.4	24.65	37.7	22.3	15.14	44.9
23.6	28.24	18.9	23.5	29.17	28.8	23.4	24.44	38.0	23.3	14.76	45.1
24.6	28.33	19.1	24.5	29.12	29.1	24.4	24.23	38.2	24.3	14.36	45.3
25.6	28.43	19.4	25.5	29.07	29.4	25.4	24.01	38.5	25.3	13.95	45.5
26.6	28.54	19.7	26.5	29.02	29.7	26.4	23.76	38.8	26.3	13.53	45.6
27.6	28.66	19.9	27.5	28.95	30.0	27.4	23.49	39.2	27.3	13.10	45.8
28.6	28.79	20.2	28.5	28.87	30.4	28.4	23.20	39.5	28.3	12.68	45.9
29.6	28.92	20.5	29.5	28.77	30.8	29.4	22.90	39.8	29.3	12.28	46.0
30.6	29.04	20.8	30.5	28.64	31.1	30.4	22.58	40.0	30.3	11.89	46.1
31.6	29.14	21.2	31.5	28.50	31.5	31.4	22.26	40.2	31.3	11.51	46.2
32.6	29.23	21.6	32.5	28.34	31.8	32.4	21.95	40.5	32.3	11.14	46.3

APPARENT PLACES OF  $\delta$  URSAE MINORIS, FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	SEPTEMBER.		Mean Solar Date.	OCTOBER.		Mean Solar Date.	NOVEMBER.		Mean Solar Date.	DECEMBER.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 18 10	+86° 36'		<sup>h</sup> <sup>m</sup> 18 10	+86° 36'		<sup>h</sup> <sup>m</sup> 18 10	+86° 36'		<sup>h</sup> <sup>m</sup> 18 10	+86° 36'
1.3	71.14	46.3	1.2	58.53	48.1	1.1	45.84	45.3	1.1	36.59	38.4
2.3	70.78	46.4	2.2	58.13	48.1	2.1	45.43	45.2	2.1	36.28	38.1
3.3	70.41	46.6	3.2	57.71	48.1	3.1	45.03	45.0	3.1	36.04	37.7
4.3	70.03	46.7	4.2	57.28	48.1	4.1	44.64	44.8	4.1	35.82	37.4
5.3	69.64	46.9	5.2	56.83	48.1	5.1	44.26	44.6	5.1	35.63	37.1
6.3	69.24	47.0	6.2	56.37	48.1	6.1	43.89	44.4	6.1	35.46	36.8
7.3	68.82	47.1	7.2	55.91	48.0	7.1	43.54	44.1	7.0	35.30	36.5
8.3	68.38	47.3	8.2	55.46	48.0	8.1	43.20	43.9	8.0	35.14	36.2
9.3	67.93	47.4	9.2	55.01	47.9	9.1	42.88	43.7	9.0	34.98	35.9
10.3	67.48	47.4	10.2	54.58	47.8	10.1	42.58	43.5	10.0	34.81	35.6
11.3	67.03	47.5	11.2	54.17	47.7	11.1	42.28	43.3	11.0	34.63	35.3
12.3	66.59	47.5	12.2	53.77	47.6	12.1	41.96	43.1	12.0	34.45	35.0
13.3	66.17	47.6	13.2	53.38	47.5	13.1	41.63	42.9	13.0	34.26	34.8
14.3	65.77	47.6	14.2	52.99	47.4	14.1	41.29	42.7	14.0	34.08	34.5
15.3	65.37	47.7	15.2	52.59	47.4	15.1	40.94	42.5	15.0	33.90	34.1
16.3	64.97	47.7	16.2	52.19	47.3	16.1	40.59	42.3	16.0	33.74	33.8
17.3	64.57	47.8	17.2	51.77	47.3	17.1	40.24	42.1	17.0	33.61	33.4
18.3	64.16	47.9	18.2	51.33	47.2	18.1	39.90	41.8	18.0	33.50	33.0
19.3	63.74	48.0	19.2	50.89	47.1	19.1	39.58	41.5	19.0	33.41	32.7
20.3	63.30	48.1	20.2	50.44	47.0	20.1	39.29	41.3	20.0	33.34	32.3
21.3	62.84	48.1	21.2	50.00	46.9	21.1	39.02	41.0	21.0	33.28	32.0
22.3	62.38	48.2	22.2	49.57	46.8	22.1	38.76	40.7	22.0	33.23	31.7
23.2	61.91	48.2	23.2	49.16	46.6	23.1	38.52	40.4	23.0	33.17	31.4
24.2	61.44	48.2	24.2	48.76	46.4	24.1	38.30	40.2	24.0	33.11	31.1
25.2	60.99	48.2	25.2	48.38	46.3	25.1	38.07	39.9	25.0	33.04	30.8
26.2	60.55	48.2	26.2	48.02	46.1	26.1	37.83	39.7	26.0	32.96	30.5
27.2	60.13	48.1	27.2	47.67	46.0	27.1	37.58	39.5	27.0	32.88	30.2
28.2	59.73	48.1	28.2	47.33	45.8	28.1	37.32	39.2	28.0	32.81	29.9
29.2	59.33	48.1	29.2	46.98	45.7	29.1	37.05	38.9	29.0	32.75	29.5
30.2	58.93	48.1	30.2	46.61	45.6	30.1	36.78	38.7	30.0	32.70	29.1
31.2	58.53	48.1	31.2	46.23	45.5	31.1	36.52	38.4	31.0	32.66	28.8
32.2	58.13	48.1	32.1	45.84	45.3	32.1	36.28	38.1	32.0	32.65	28.4

APPARENT PLACES OF  $\lambda$  URSÆ MINORIS, FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	JANUARY.		Mean Solar Date.	FEBRUARY.		Mean Solar Date.	MARCH.		Mean Solar Date.	APRIL.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 19 43	<sup>°</sup> <sup>'</sup> +88 56		<sup>h</sup> <sup>m</sup> 19 43	<sup>°</sup> <sup>'</sup> +88 56		<sup>h</sup> <sup>m</sup> 19 43	<sup>°</sup> <sup>'</sup> +88 56		<sup>h</sup> <sup>m</sup> 19 44	<sup>°</sup> <sup>'</sup> +88 56
1.1	<sup>s</sup> 36.57	<sup>"</sup> 30.8	1.0	<sup>s</sup> 31.64	<sup>"</sup> 21.2	1.9	<sup>s</sup> 46.32	<sup>"</sup> 13.2	1.8	<sup>s</sup> 16.33	<sup>"</sup> 8.6
2.1	36.19	30.5	2.0	31.78	20.9	2.9	47.00	13.0	2.8	17.41	8.6
3.1	35.79	30.2	3.0	31.91	20.6	3.9	47.69	12.8	3.8	18.55	8.5
4.0	35.35	30.0	4.0	32.05	20.3	4.9	48.41	12.5	4.8	19.74	8.4
5.0	34.88	29.7	5.0	32.22	20.0	5.9	49.19	12.3	5.8	20.95	8.4
6.0	34.38	29.5	6.0	32.43	19.6	6.9	50.04	12.0	6.8	22.17	8.3
7.0	33.86	29.2	7.0	32.71	19.3	7.9	50.96	11.8	7.8	23.38	8.4
8.0	33.35	28.8	8.0	33.06	19.0	8.9	51.93	11.6	8.8	24.56	8.4
9.0	32.88	28.5	9.0	33.50	18.6	9.9	52.94	11.4	9.8	25.68	8.4
10.0	32.47	28.2	9.9	34.00	18.3	10.9	53.96	11.2	10.8	26.75	8.4
11.0	32.13	27.8	10.9	34.52	18.0	11.9	54.97	11.1	11.8	27.77	8.5
12.0	31.89	27.5	11.9	35 04	17.8	12.9	55.94	10.9	12.8	28.77	8.5
13.0	31.70	27.1	12.9	35.55	17.5	13.9	56.87	10.8	13.8	29.76	8.5
14.0	31.56	26.8	13.9	36.04	17.3	14.8	57.76	10.7	14.8	30.77	8.5
15.0	31.45	26.5	14.9	36.50	17.0	15.8	58.61	10.5	15.8	31.83	8.5
16.0	31.35	26.2	15.9	36.92	16.8	16.8	59.45	10.4	16.8	32.96	8.5
17.0	31.22	25.9	16.9	37.33	16.4	17.8	60.33	10.2	17.8	34.15	8.5
18.0	31.06	25.7	17.9	37.75	16.2	18.8	61.26	10.1	18.8	35.38	8.5
19.0	30.87	25.4	18.9	38.22	15.9	19.8	62.25	9.9	19.8	36.63	8.5
20.0	30.67	25.1	19.9	38.76	15.6	20.8	63.31	9.7	20.8	37.88	8.6
21.0	30.47	24.8	20.9	39.38	15.3	21.8	64.43	9.6	21.8	39.10	8.7
22.0	30.29	24.4	21.9	40.07	15.0	22.8	65.61	9.4	22.7	40.27	8.8
23.0	30.16	24.1	22.9	40.84	14.7	23.8	66.81	9.3	23.7	41.37	8.9
24.0	30.12	23.7	23.9	41.65	14.5	24 8	67.99	9.2	24.7	42.40	9.0
25.0	30.16	23.4	24.9	42.47	14.2	25.8	69.15	9.1	25.7	43.38	9.1
26.0	30.29	23.0	25.9	43.30	14.0	26.8	70.28	9.1	26.7	44.34	9.2
27.0	30.49	22.7	26.9	44.12	13.8	27.8	71.34	9.0	27.7	45.29	9.3
28.0	30.73	22.3	27.9	44.90	13.6	28.8	72.34	9.0	28.7	46.26	9.4
29.0	30.98	22.0	28.9	45.63	13.4	29.8	73.32	8.9	29.7	47.26	9.5
30.0	31.23	21.7	29.9	46.32	13.2	30.8	74.30	8.8	30.7	48.31	9.6
31.0	31.46	21.5	30.9	47.00	13.0	31.8	75.30	8.7	31.7	49.40	9.6
32.0	31.64	21.2	31.9	47.69	12.8	32.8	76.33	8.6	32.7	50.52	9.7

## APPARENT PLACES OF $\lambda$ URSAE MINORIS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	MAY.		Mean Solar Date.	JUNE.		Mean Solar Date.	JULY.		Mean Solar Date.	AUGUST.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 19 44	<sup>°</sup> <sup>'</sup> +88 56		<sup>h</sup> <sup>m</sup> 19 45	<sup>°</sup> <sup>'</sup> +88 56		<sup>h</sup> <sup>m</sup> 19 45	<sup>°</sup> <sup>'</sup> +88 56		<sup>h</sup> <sup>m</sup> 19 44	<sup>°</sup> <sup>'</sup> +88 56
	<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>
1.7	49.40	9.6	1.6	16.32	15.9	1.6	27.30	25.2	1.5	80.00	35.8
2.7	50.52	9.7	2.6	16.99	16.2	2.6	27.28	25.6	2.5	79.39	36.1
3.7	51.65	9.9	3.6	17.58	16.5	3.6	27.20	26.0	3.5	78.82	36.4
4.7	52.77	10.0	4.6	18.10	16.8	4.5	27.09	26.3	4.5	78.28	36.7
5.7	53.84	10.2	5.6	18.57	17.1	5.5	26.99	26.6	5.5	77.78	37.0
6.7	54.86	10.4	6.6	19.00	17.4	6.5	26.91	26.9	6.5	77.31	37.3
7.7	55.81	10.6	7.6	19.42	17.7	7.5	26.87	27.2	7.5	76.84	37.6
8.7	56.70	10.8	8.6	19.85	17.9	8.5	26.87	27.5	8.5	76.33	37.9
9.7	57.54	11.0	9.6	20.32	18.2	9.5	26.91	27.8	9.4	75.78	38.3
10.7	58.36	11.1	10.6	20.83	18.5	10.5	26.95	28.2	10.4	75.17	38.6
11.7	59.17	11.3	11.6	21.38	18.7	11.5	26.98	28.5	11.4	74.47	39.0
12.7	60.02	11.4	12.6	21.95	19.0	12.5	26.98	28.9	12.4	73.70	39.3
13.7	60.92	11.6	13.6	22.53	19.3	13.5	26.92	29.3	13.4	72.88	39.7
14.7	61.87	11.7	14.6	23.08	19.6	14.5	26.80	29.6	14.4	72.04	40.0
15.7	62.86	11.9	15.6	23.59	19.9	15.5	26.59	30.0	15.4	71.19	40.3
16.7	63.88	12.1	16.6	24.03	20.3	16.5	26.30	30.4	16.4	70.35	40.5
17.7	64.90	12.3	17.6	24.38	20.7	17.5	25.95	30.7	17.4	69.54	40.8
18.7	65.88	12.5	18.6	24.66	21.0	18.5	25.59	31.1	18.4	68.76	41.1
19.7	66.81	12.8	19.6	24.88	21.3	19.5	25.23	31.4	19.4	68.02	41.3
20.7	67.67	13.0	20.6	25.06	21.6	20.5	24.90	31.7	20.4	67.29	41.6
21.7	68.46	13.3	21.6	25.23	22.0	21.5	24.60	32.0	21.4	66.55	41.9
22.7	69.18	13.5	22.6	25.41	22.2	22.5	24.33	32.3	22.4	65.78	42.2
23.7	69.85	13.8	23.6	25.62	22.5	23.5	24.08	32.6	23.4	64.95	42.6
24.7	70.50	14.0	24.6	25.86	22.8	24.5	23.83	32.9	24.4	64.06	42.9
25.7	71.15	14.2	25.6	26.13	23.1	25.5	23.56	33.3	25.4	63.10	43.2
26.7	71.82	14.4	26.6	26.42	23.4	26.5	23.24	33.7	26.4	62.08	43.5
27.7	72.52	14.6	27.6	26.71	23.8	27.5	22.85	34.1	27.4	61.01	43.8
28.6	73.27	14.8	28.6	26.96	24.1	28.5	22.39	34.4	28.4	59.92	44.1
29.6	74.04	15.1	29.6	27.14	24.5	29.5	21.86	34.8	29.4	58.84	44.3
30.6	74.82	15.3	30.6	27.25	24.9	30.5	21.27	35.1	30.4	57.79	44.6
31.6	75.59	15.6	31.6	27.30	25.2	31.5	20.64	35.5	31.4	56.80	44.8
32.6	76.32	15.9	32.6	27.28	25.6	32.5	20.00	35.8	32.4	55.86	45.0

APPARENT PLACES OF  $\lambda$  URSAE MINORIS, FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	SEPTEMBER.		Mean Solar Date.	OCTOBER.		Mean Solar Date.	NOVEMBER.		Mean Solar Date.	DECEMBER.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 19 44	+88° 56'		<sup>h</sup> <sup>m</sup> 19 43	+88° 56'		<sup>h</sup> <sup>m</sup> 19 43	+88° 56'		<sup>h</sup> <sup>m</sup> 19 42	+88° 56'
	<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>
1.4	55.86	45.0	1.3	80.80	51.0	1.2	38.96	53.1	1.1	61.22	50.2
2.4	54.96	45.2	2.3	79.61	51.2	2.2	37.55	53.1	2.1	60.02	50.0
3.4	54.07	45.5	3.3	78.38	51.4	3.2	36.10	53.1	3.1	58.85	49.8
4.4	53.17	45.7	4.3	77.10	51.5	4.2	34.64	53.0	4.1	57.74	49.5
5.4	52.23	46.0	5.3	75.75	51.7	5.2	33.20	53.0	5.1	56.70	49.3
6.4	51.22	46.3	6.3	74.33	51.8	6.2	31.78	52.9	6.1	55.72	49.1
7.4	50.14	46.6	7.3	72.88	51.9	7.2	30.41	52.8	7.1	54.80	48.9
8.4	49.00	46.8	8.3	71.42	52.0	8.2	29.10	52.7	8.1	53.92	48.7
9.4	47.80	47.1	9.3	69.97	52.1	9.2	27.85	52.6	9.1	53.05	48.5
10.4	46.57	47.3	10.3	68.56	52.2	10.2	26.65	52.6	10.1	52.16	48.3
11.4	45.32	47.5	11.3	67.19	52.2	11.2	25.46	52.5	11.1	51.24	48.1
12.4	44.09	47.7	12.3	65.87	52.3	12.2	24.25	52.5	12.1	50.28	47.9
13.4	42.90	47.9	13.3	64.60	52.4	13.2	23.01	52.4	13.1	49.29	47.7
14.4	41.75	48.1	14.3	63.35	52.4	14.2	21.73	52.4	14.1	48.28	47.5
15.4	40.64	48.3	15.3	62.09	52.5	15.2	20.40	52.3	15.1	47.26	47.3
16.4	39.55	48.5	16.3	60.80	52.6	16.2	19.03	52.3	16.1	46.27	47.0
17.3	38.46	48.7	17.3	59.47	52.7	17.2	17.63	52.2	17.1	45.34	46.7
18.3	37.36	48.9	18.3	58.08	52.8	18.2	16.23	52.0	18.1	44.48	46.4
19.3	36.21	49.1	19.3	56.63	52.9	19.2	14.87	51.9	19.1	43.70	46.1
20.3	35.00	49.3	20.3	55.14	53.0	20.2	13.57	51.8	20.1	43.00	45.9
21.3	33.73	49.6	21.3	53.64	53.0	21.2	12.34	51.6	21.1	42.37	45.6
22.3	32.41	49.8	22.2	52.14	53.0	22.2	11.18	51.4	22.1	41.77	45.3
23.3	31.04	50.0	23.2	50.66	53.0	23.2	10.09	51.3	23.1	41.17	45.1
24.3	29.64	50.1	24.2	49.23	53.0	24.2	9.04	51.1	24.1	40.56	44.8
25.3	28.25	50.3	25.2	47.87	53.0	25.2	8.00	51.0	25.1	39.93	44.6
26.3	26.89	50.4	26.2	46.57	53.0	26.2	6.96	50.9	26.1	39.26	44.4
27.3	25.59	50.5	27.2	45.32	53.0	27.2	5.89	50.7	27.1	38.55	44.1
28.3	24.34	50.6	28.2	44.10	53.0	28.1	4.78	50.6	28.1	37.83	43.8
29.3	23.13	50.8	29.2	42.88	53.0	29.1	3.62	50.5	29.1	37.11	43.5
30.3	21.96	50.9	30.2	41.62	53.0	30.1	2.43	50.3	30.1	36.42	43.2
31.3	20.80	51.0	31.2	40.31	53.0	31.1	1.22	50.2	31.1	35.80	42.9
32.3	19.61	51.2	32.2	38.96	53.1	32.1	0.02	50.0	32.1	35.26	42.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Andromedæ.		$\gamma$ Pegasi. (Algenib.)		$\beta$ Hydri.		$\alpha$ Cassiopææ.									
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.								
	<sup>h</sup> 0	<sup>m</sup> 2	<sup>°</sup> +28	<sup>'</sup> 25	<sup>h</sup> 0	<sup>m</sup> 7	<sup>°</sup> +14	<sup>'</sup> 30	<sup>h</sup> 0	<sup>m</sup> 19	<sup>°</sup> -77	<sup>'</sup> 55	<sup>h</sup> 0	<sup>m</sup> 33	<sup>°</sup> +55	<sup>'</sup> 52
(Dec.30.3)	<sup>s</sup> 8.57	-13	<sup>"</sup> 35.5	-0.7	<sup>s</sup> 0.09	-.11	<sup>"</sup> 49.3	-0.7	<sup>s</sup> 23.70	-.95	<sup>"</sup> 86.4	+0.8	<sup>s</sup> 39.45	-.96	<sup>"</sup> 46.7	-0.1
Jan. 9.2	8.44	.13	34.6	1.0	0.88	.11	48.5	0.9	22.77	.90	85.3	1.4	39.18	.37	46.3	0.6
19.2	8.32	.12	33.4	1.3	0.78	.10	47.6	0.9	21.90	.83	83.7	1.9	38.91	.37	45.4	1.1
29.2	8.21	.10	32.1	1.4	0.68	.09	46.7	1.0	21.12	.74	81.5	2.4	38.65	.35	44.1	1.6
Feb. 8.1	8.11	.08	30.6	1.5	0.60	.07	45.6	1.0	20.44	.62	78.8	2.9	38.42	.32	42.3	1.9
18.1	8.04	.06	29.0	1.6	0.55	.04	44.7	1.0	19.87	.50	75.7	3.2	38.22	.17	40.2	2.2
28.1	8.01	-.02	27.4	1.6	0.52	-.02	43.7	0.8	19.45	.35	72.3	3.5	38.08	.12	37.9	2.4
Mar. 10.0	8.01	+0.2	25.9	1.5	0.52	+0.2	43.0	0.7	19.17	.30	68.7	3.7	37.99	-.06	35.4	2.5
20.0	8.05	.06	24.5	1.3	0.55	.06	42.4	0.5	19.04	-.05	64.9	3.8	37.96	+0.1	32.9	2.5
30.0	8.13	.11	23.3	1.0	0.63	.10	42.0	-0.2	19.07	+1.1	61.0	3.9	38.01	.09	30.4	2.4
Apr. 9.0	8.26	.15	22.4	0.7	0.74	.14	41.9	0.0	19.26	.27	57.2	3.8	38.14	.16	28.2	2.1
19.0	8.44	.30	21.9	-0.4	0.90	.18	42.1	+0.4	19.60	.42	53.4	3.7	38.33	.23	26.2	1.8
28.9	8.66	.34	21.7	0.0	1.10	.32	42.7	0.7	20.10	.57	49.8	3.5	38.60	.30	24.5	1.5
May 8.9	8.92	.38	21.9	+0.4	1.34	.35	43.5	1.0	20.74	.71	46.5	3.2	38.94	.36	23.3	1.0
18.9	9.21	.31	22.5	0.8	1.61	.38	44.6	1.3	21.50	.83	43.4	2.9	39.32	.41	22.5	0.5
28.8	9.53	.33	23.4	1.2	1.90	.31	46.1	1.5	22.38	.93	40.8	2.4	39.76	.45	22.2	-0.1
June 7.8	9.87	.35	24.8	1.5	2.22	.32	47.7	1.8	23.35	1.01	38.5	2.0	40.23	.48	22.4	+0.4
17.8	10.22	.35	26.4	1.8	2.54	.33	49.6	2.0	24.39	1.07	36.8	1.4	40.72	.49	23.0	0.9
27.7	10.57	.35	28.4	2.1	2.87	.33	51.6	2.1	25.48	1.09	35.7	0.9	41.21	.50	24.2	1.4
July 7.7	10.91	.34	30.6	2.3	3.19	.32	53.8	2.2	26.57	1.08	35.0	+0.3	41.71	.49	25.8	1.8
17.7	11.24	.32	32.9	2.4	3.50	.30	56.0	2.2	27.66	1.06	35.0	-0.2	42.18	.46	27.9	2.2
27.7	11.55	.29	35.4	2.5	3.79	.27	58.2	2.2	28.68	.99	35.5	0.8	42.63	.43	30.2	2.5
Aug. 6.6	11.82	.25	37.9	2.5	4.05	.24	60.3	2.1	29.63	.90	36.6	1.4	43.04	.39	32.9	2.8
16.6	12.05	.22	40.5	2.5	4.28	.21	62.3	2.0	30.47	.78	38.2	1.8	43.40	.34	35.8	3.0
26.6	12.25	.18	43.0	2.5	4.47	.17	64.2	1.8	31.17	.63	40.3	2.3	43.72	.29	38.9	3.2
Sept. 5.6	12.41	.14	45.4	2.3	4.62	.13	65.9	1.6	31.72	.46	42.8	2.6	43.98	.23	43.1	3.2
15.5	12.52	.09	47.6	2.2	4.74	.10	67.5	1.4	32.09	.36	45.5	2.9	44.19	.18	45.4	3.3
25.5	12.60	.06	49.7	2.0	4.82	.08	68.8	1.2	32.27	+0.2	48.5	3.0	44.34	.12	48.6	3.2
Oct. 5.5	12.64	+0.2	51.6	1.8	4.86	+0.3	69.9	1.0	32.25	-.11	51.6	3.0	44.43	.06	51.8	3.1
15.4	12.64	-.01	53.3	1.5	4.87	.00	70.8	0.7	32.05	.39	54.6	3.0	44.46	+0.1	54.8	2.9
25.4	12.61	.04	54.7	1.3	4.85	-.03	71.4	0.5	31.07	.47	57.4	2.7	44.44	-.04	57.7	2.7
Nov. 4.4	12.55	.07	55.8	1.0	4.81	.06	71.8	0.3	31.12	.62	60.0	2.4	44.37	.09	60.2	2.4
14.4	12.47	.09	56.6	0.7	4.74	.07	72.0	+0.1	30.43	.75	62.2	2.0	44.26	.14	62.5	2.1
24.3	12.37	.11	57.2	+0.4	4.66	.09	72.0	-0.1	29.62	.86	64.0	1.5	44.10	.18	64.3	1.6
Dec. 4.3	12.26	.12	57.4	0.0	4.56	.10	71.8	0.3	28.73	.92	65.1	0.9	43.90	.21	65.7	1.2
14.3	12.13	.13	57.2	-0.3	4.46	.11	71.3	0.5	27.78	.96	65.7	-0.3	43.67	.24	66.7	0.7
24.3	12.00	.13	56.8	0.6	4.35	.11	70.8	0.7	26.82	.96	65.7	+0.3	43.42	.26	67.1	+0.2
34.2	11.87	-.13	56.1	-0.9	4.24	-.11	70.0	-0.8	25.86	-.94	65.0	+1.0	43.16	-.27	67.0	-0.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Ceti.		$\gamma$ 21 Cassiope.		$\epsilon$ Piscium.		$\theta$ Ceti.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 0 37	<sup>°</sup> <sup>'</sup> -18 38	<sup>h</sup> <sup>m</sup> 0 37	<sup>°</sup> <sup>'</sup> +74 19	<sup>h</sup> <sup>m</sup> 0 56	<sup>°</sup> <sup>'</sup> +7 14	<sup>h</sup> <sup>m</sup> 1 17	<sup>°</sup> <sup>'</sup> -8 47
(Dec. 30.3)	<sup>s</sup> 31.84	<sup>"</sup> -12	<sup>s</sup> 40.91	<sup>"</sup> -67	<sup>s</sup> 40.83	<sup>"</sup> -11	<sup>s</sup> 59.68	<sup>"</sup> -11
Jan. 9.2	31.72 .12	64.7 -0.6	40.23 .68	58.3 +0.3	40.73 .11	26.3 -0.6	59.57 .12	85.5 -0.8
19.2	31.60 .12	65.1 0.3	39.55 .67	58.3 -0.3	40.61 .11	25.6 0.7	59.45 .12	86.2 0.6
29.2	31.49 .11	65.3 -0.1	39.55 .67	57.8 0.9	40.61 .11	24.9 0.7	59.45 .12	86.8 0.5
Feb. 8.1	31.49 .11	65.3 +0.2	38.90 .62	56.6 1.4	40.50 .11	24.2 0.7	59.33 .12	87.1 0.3
18.1	31.39 .09	65.0 0.4	38.32 .55	54.9 1.9	40.40 .10	23.6 0.6	59.21 .11	87.3 -0.1
28.1	31.30 .07	64.4 0.7	37.81 .46	52.7 2.4	40.31 .08	23.0 0.5	59.11 .10	87.3 +0.1
Mar. 10.1	31.24 .05	63.5 1.0	37.41 .34	50.2 2.7	40.24 .06	22.6 0.4	59.02 .08	87.0 0.4
20.0	31.21 -0.02	62.4 1.2	37.14 .30	47.4 2.9	40.19 -0.03	22.2 -0.2	58.95 .05	86.5 0.6
30.0	31.21 +0.02	61.0 1.5	37.02 -0.05	44.4 3.0	40.18 .00	22.1 0.0	58.91 -0.02	85.7 0.9
Apr. 9.0	31.25 .06	59.4 1.7	37.04 +0.10	41.5 2.9	40.20 +0.04	22.1 +0.2	58.91 +0.02	84.8 1.1
19.0	31.33 .10	57.5 1.9	37.22 .25	38.6 2.8	40.27 .09	22.4 0.4	58.95 .06	83.5 1.3
29.9	31.45 .14	55.5 2.1	37.55 .40	36.0 2.5	40.38 .13	23.0 0.7	59.03 .10	82.1 1.6
May 8.9	31.61 .18	53.3 2.2	38.02 .54	33.6 2.1	40.53 .17	23.8 0.9	59.15 .14	80.4 1.8
18.9	31.81 .22	51.0 2.3	38.62 .66	31.7 1.7	40.72 .21	24.8 1.2	59.32 .19	78.6 1.9
28.8	32.05 .26	48.6 2.4	39.33 .76	30.2 1.2	40.95 .25	26.1 1.4	59.52 .22	76.6 2.1
June 7.8	32.32 .29	46.2 2.4	40.13 .83	29.3 0.7	41.21 .28	27.6 1.6	59.76 .26	74.5 2.1
17.8	32.62 .31	43.8 2.3	40.99 .88	28.9 -0.1	41.50 .30	29.3 1.8	60.03 .28	72.3 2.2
27.8	32.93 .32	41.6 2.2	41.89 .91	20.0 +0.4	41.81 .31	31.2 1.9	60.33 .30	70.1 2.2
July 7.7	33.26 .33	39.5 2.0	42.81 .92	20.7 0.9	42.12 .32	33.1 2.0	60.64 .31	68.0 2.1
17.7	33.58 .32	37.5 1.8	43.72 .90	30.9 1.5	42.44 .32	35.1 2.0	60.95 .32	65.9 2.0
27.7	33.90 .31	35.9 1.5	44.59 .86	32.6 1.9	42.76 .31	37.1 2.0	61.27 .31	64.0 1.8
Aug. 6.7	34.21 .30	34.5 1.2	45.42 .80	34.7 2.4	43.06 .29	39.1 1.9	61.57 .30	62.3 1.6
16.6	34.49 .27	33.5 0.9	46.19 .72	37.3 2.8	43.35 .27	40.9 1.7	61.87 .28	60.9 1.3
26.6	34.75 .24	32.8 0.5	46.87 .64	40.2 3.1	43.61 .24	42.6 1.6	62.14 .26	59.8 1.0
Sept. 5.6	34.97 .20	32.5 +0.1	47.46 .54	43.4 3.3	43.84 .21	44.1 1.4	62.38 .23	58.9 0.7
15.5	35.16 .17	32.5 -0.2	47.94 .43	46.9 3.5	44.03 .18	45.4 1.2	62.59 .20	58.4 +0.4
25.5	35.30 .13	32.9 0.5	48.32 .32	50.5 3.6	44.19 .14	46.5 1.0	62.77 .16	58.2 0.0
Oct. 5.5	35.41 .09	33.5 0.8	48.58 .20	54.1 3.7	44.32 .11	47.3 0.7	62.92 .13	58.3 -0.2
15.5	35.48 .05	34.4 1.0	48.73 +0.09	57.8 3.7	44.42 .08	47.9 0.5	63.03 .09	58.7 0.5
25.4	35.51 +0.01	35.5 1.2	48.75 -0.03	61.4 3.6	44.48 .04	48.3 0.3	63.10 .06	59.3 0.7
Nov. 4.4	35.51 -0.02	36.8 1.3	48.66 .15	64.9 3.4	44.51 +0.01	48.5 +0.1	63.15 +0.03	60.1 0.9
14.4	35.48 .04	38.1 1.3	48.45 .26	68.2 3.1	44.51 -0.01	48.5 -0.1	63.16 .00	61.1 1.0
24.3	35.42 .07	39.5 1.3	48.14 .36	71.1 2.7	44.48 .03	48.3 0.2	63.15 -0.03	62.1 1.1
Dec. 4.3	35.34 .09	40.8 1.2	47.73 .46	73.6 2.3	44.44 .06	48.0 0.4	63.11 .05	63.2 1.1
14.3	35.25 .10	42.0 1.1	47.23 .54	75.7 1.8	44.37 .07	47.6 0.5	63.05 .07	64.3 1.1
24.3	35.14 .11	43.0 0.9	46.65 .61	77.3 1.3	44.29 .09	47.1 0.6	62.97 .09	65.3 1.0
34.2	35.02 .12	43.8 0.7	46.02 .66	78.3 0.7	44.19 .10	46.5 0.6	62.88 .10	66.2 0.9
	34.90 -0.13	44.5 -0.5	45.34 -0.68	78.7 +0.1	44.09 -0.11	45.8 -0.7	62.77 -0.12	67.1 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*38 Cassiopeæ.		η Piscium.		α Eridani. (Achernar.)		ο Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 1 22	<sup>m</sup> +69° 38'	<sup>h</sup> 1 25	<sup>m</sup> +14° 43'	<sup>h</sup> 1 33	<sup>m</sup> -57° 50'	<sup>h</sup> 1 39	<sup>m</sup> +8° 32'
(Dec. 30.3)	<sup>s</sup> 16.08 -46	52.9 +0.8	<sup>s</sup> 1.66 -10	29.4 -0.5	<sup>s</sup> 13.89 -32	76.1 -0.7	<sup>s</sup> 1.60 -10	62.2 -0.6
Jan. 9.3	15.60 .49	53.4 +0.2	1.55 .11	28.9 0.6	13.56 .33	76.5 -0.1	1.50 .11	61.6 0.6
10.2	15.10 .51	53.3 -0.4	1.43 .12	28.2 0.7	13.22 .34	76.4 +0.4	1.38 .12	60.9 0.6
20.2	14.60 .50	52.7 0.9	1.30 .12	27.5 0.7	12.89 .33	75.7 1.0	1.26 .12	60.3 0.6
Feb. 8.2	14.11 .47	51.5 1.5	1.18 .12	26.7 0.8	12.57 .31	74.4 1.5	1.14 .12	59.7 0.6
18.1	13.67 .41	49.8 1.9	1.07 .11	26.0 0.8	12.28 .28	72.7 2.0	1.02 .11	59.1 0.5
28.1	13.29 .34	47.6 2.3	0.97 .08	25.2 0.7	12.02 .24	70.5 2.4	0.92 .09	58.6 0.4
Mar. 10.1	13.00 .24	45.2 2.6	0.90 .06	24.5 0.6	11.80 .19	67.9 2.8	0.84 .07	58.3 0.3
20.1	12.80 .14	42.5 2.7	0.86 -0.02	24.0 0.5	11.64 .14	64.9 3.1	0.78 -0.03	58.1 -0.1
30.0	12.72 -0.02	39.7 2.8	0.86 +0.02	23.6 0.3	11.53 .07	61.7 3.3	0.77 .00	58.0 0.0
Apr. 9.0	12.76 +10	37.0 2.7	0.90 .06	23.4 -0.1	11.49 -0.01	58.3 3.5	0.79 +0.04	58.2 +0.3
19.0	12.92 .22	34.3 2.6	0.98 .10	23.4 +0.2	11.51 +0.06	54.8 3.6	0.86 .09	58.6 0.5
29.0	13.20 .33	31.9 2.3	1.11 .15	23.7 0.4	11.61 .13	51.2 3.6	0.97 .13	59.2 0.7
May 8.9	13.59 .44	29.7 1.9	1.28 .19	24.3 0.7	11.78 .20	47.6 3.5	1.12 .18	60.1 1.0
18.9	14.08 .54	28.0 1.5	1.49 .23	25.1 1.0	12.01 .27	44.1 3.4	1.32 .22	61.2 1.2
28.9	14.66 .62	26.7 1.1	1.75 .27	26.2 1.2	12.31 .33	40.8 3.2	1.56 .26	62.5 1.4
June 7.8	15.31 .68	25.9 0.6	2.03 .29	27.5 1.4	12.66 .38	37.7 2.9	1.82 .28	64.0 1.6
17.8	16.01 .73	25.5 -0.1	2.33 .31	29.1 1.6	13.06 .49	35.0 2.5	2.11 .30	65.7 1.7
27.8	16.74 .75	25.7 +0.4	2.65 .32	30.8 1.8	13.50 .45	32.7 2.1	2.42 .32	67.5 1.8
July 7.8	17.49 .75	26.4 0.9	2.98 .33	32.6 1.9	13.96 .47	30.8 1.6	2.74 .32	69.4 1.9
17.7	18.24 .74	27.6 1.4	3.31 .32	34.5 1.9	14.44 .48	29.4 1.1	3.06 .32	71.2 1.9
27.7	18.97 .71	29.2 1.9	3.62 .31	36.4 1.9	14.91 .47	28.6 +0.5	3.38 .31	73.1 1.8
Aug. 6.7	19.66 .67	31.3 2.3	3.93 .29	38.3 1.9	15.37 .45	28.3 0.0	3.68 .29	74.8 1.7
16.6	20.30 .61	33.8 2.6	4.21 .27	40.1 1.8	15.81 .42	28.6 -0.6	3.96 .27	76.5 1.6
26.6	20.88 .55	36.5 2.9	4.46 .24	41.8 1.6	16.20 .37	29.5 1.2	4.22 .24	77.9 1.4
Sept. 5.6	21.39 .47	39.6 3.1	4.69 .21	43.4 1.5	16.55 .32	30.9 1.7	4.45 .22	79.2 1.2
15.6	21.83 .38	42.8 3.3	4.88 .18	44.8 1.3	16.84 .26	32.8 2.1	4.65 .18	80.3 1.0
25.5	22.18 .31	46.2 3.4	5.04 .14	46.0 1.1	17.06 .19	35.1 2.5	4.82 .15	81.1 0.7
Oct. 5.5	22.45 .22	49.6 3.5	5.16 .11	47.0 0.9	17.22 .12	37.8 2.7	4.96 .12	81.8 0.5
15.5	22.62 .13	53.1 3.4	5.26 .08	47.8 0.7	17.30 +0.05	40.6 2.9	5.06 .09	82.2 0.3
25.5	22.71 +0.04	56.5 3.3	5.32 .05	48.4 0.5	17.31 -0.02	43.6 3.0	5.14 .06	82.4 +0.1
Nov. 4.4	22.70 -0.05	59.7 3.1	5.35 +0.02	48.9 0.3	17.26 .09	46.5 2.9	5.18 +0.03	82.4 -0.1
14.4	22.61 .14	62.7 2.9	5.35 -0.01	49.1 +0.1	17.14 .15	49.3 2.7	5.20 .00	82.3 0.2
24.4	22.42 .22	65.4 2.5	5.33 .03	49.2 0.0	16.96 .20	51.9 2.4	5.18 -0.02	82.0 0.3
Dec. 4.3	22.16 .30	67.8 2.1	5.20 .06	49.1 -0.2	16.74 .25	54.1 2.0	5.15 .05	81.6 0.4
14.3	21.82 .38	69.6 1.6	5.22 .08	48.8 0.3	16.47 .28	55.9 1.6	5.09 .07	81.1 0.5
24.3	21.41 .43	71.0 1.1	5.13 .10	48.4 0.4	16.17 .31	57.3 1.1	5.01 .09	80.6 0.6
34.3	20.95 -48	71.9 +0.6	5.02 -11	47.9 -0.6	15.85 -33	58.1 -0.5	4.91 -11	80.0 -0.6



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Arietis.		*50 Cassiopeæ.		$\alpha$ Arietis.		$\zeta$ Ceti.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 1 47	<sup>°</sup> <sup>'</sup> +20 13	<sup>h</sup> <sup>m</sup> 1 53	<sup>°</sup> <sup>'</sup> +71 50	<sup>h</sup> <sup>m</sup> 2 0	<sup>°</sup> <sup>'</sup> +22 53	<sup>h</sup> <sup>m</sup> 2 6	<sup>°</sup> <sup>'</sup> +8 16
(Dec. 30.3)	<sup>s</sup> 58.73 -10	<sup>"</sup> 10.8 -0.3	<sup>s</sup> 9.84 -48	<sup>"</sup> 28.5 +1.3	<sup>s</sup> 22.64 -10	<sup>"</sup> 36.4 -0.3	<sup>s</sup> 36.59 -00	<sup>"</sup> 50.8 -0.6
Jan. 9.3	58.62 .12	10.4 0.5	9.33 .54	29.5 0.6	22.53 .12	36.1 0.4	36.49 .11	50.1 0.6
19.2	58.49 .13	9.9 0.6	8.77 .57	29.8 +0.1	22.41 .13	35.6 0.6	36.37 .12	49.5 0.6
29.2	58.36 .13	9.2 0.7	8.19 .58	29.6 -0.5	22.27 .14	35.0 0.7	36.25 .13	49.0 0.6
Feb. 8.2	58.23 .13	8.4 0.8	7.62 .56	28.8 1.1	22.13 .14	34.2 0.8	36.12 .13	48.4 0.5
18.2	58.10 .12	7.5 0.9	7.08 .52	27.5 1.6	21.99 .13	33.3 0.9	35.99 .13	47.9 0.5
28.1	57.98 .11	6.7 0.9	6.59 .45	26.6 2.0	21.86 .12	32.4 0.9	35.87 .11	47.4 0.4
Mar. 10.1	57.89 .08	5.8 0.8	6.18 .36	23.4 2.4	21.76 .09	31.5 0.9	35.76 .09	47.1 0.3
20.1	57.82 -06	5.0 0.8	5.88 .24	20.9 2.6	21.68 .06	30.5 0.9	35.69 .06	46.9 -0.1
30.1	57.80 .00	4.3 0.6	5.70 -12	18.2 2.7	21.64 -02	29.7 0.8	35.65 -02	46.8 0.0
Apr. 9.0	57.81 +04	3.7 0.4	5.64 +01	15.4 2.8	21.64 +03	29.0 0.6	35.64 +02	47.0 +0.2
19.0	57.88 .00	3.4 -0.2	5.72 .15	12.7 2.7	21.70 .08	28.5 0.4	35.68 .08	47.3 0.5
29.0	57.99 .13	3.3 0.0	5.94 .28	10.0 2.5	21.80 .12	28.2 -0.2	35.77 .11	47.9 0.7
May 8.9	58.14 .18	3.5 +0.3	6.29 .41	7.7 2.2	21.94 .17	28.2 +0.1	35.89 .15	48.7 0.9
18.9	58.34 .22	3.9 0.6	6.75 .52	5.6 1.9	22.14 .21	28.5 0.4	36.07 .19	49.8 1.1
28.9	58.59 .26	4.7 0.8	7.33 .62	3.9 1.5	22.37 .25	29.0 0.6	36.28 .23	51.0 1.3
June 7.9	58.86 .29	5.6 1.1	7.99 .70	2.7 1.0	22.64 .29	29.8 0.9	36.53 .26	52.5 1.5
17.8	59.17 .31	6.8 1.3	8.73 .77	1.9 -0.5	22.95 .31	30.8 1.1	36.80 .29	54.1 1.6
27.8	59.49 .33	8.3 1.5	9.52 .81	1.6 0.0	23.27 .33	32.1 1.4	37.10 .31	55.8 1.7
July 7.8	59.82 .33	9.9 1.7	10.34 .83	1.8 +0.5	23.61 .34	33.5 1.5	37.42 .32	57.5 1.8
17.8	60.15 .33	11.6 1.8	11.18 .83	2.5 0.9	23.95 .34	35.1 1.7	37.73 .32	59.3 1.8
27.7	60.48 .33	13.4 1.8	12.00 .82	3.7 1.4	24.28 .33	36.8 1.8	38.05 .31	61.1 1.7
Aug. 6.7	60.80 .31	15.3 1.8	12.80 .79	5.3 1.8	24.61 .32	38.6 1.8	38.36 .30	62.8 1.6
16.7	61.10 .29	17.1 1.8	13.57 .74	7.4 2.2	24.92 .30	40.4 1.8	38.65 .28	64.3 1.5
26.6	61.38 .26	18.9 1.7	14.28 .68	9.8 2.6	25.21 .28	42.2 1.8	38.92 .26	65.7 1.3
Sept. 5.6	61.63 .23	20.6 1.6	14.92 .61	12.5 2.9	25.47 .25	43.9 1.7	39.17 .24	66.9 1.1
15.6	61.85 .20	22.1 1.5	15.49 .53	15.5 3.1	25.70 .22	45.6 1.6	39.40 .21	67.9 0.9
25.6	62.03 .17	23.5 1.3	15.98 .44	18.7 3.3	25.91 .19	47.1 1.4	39.59 .18	68.7 0.7
Oct. 5.5	62.19 .14	24.8 1.2	16.37 .35	22.0 3.4	26.08 .15	48.4 1.3	39.75 .15	69.2 0.4
15.5	62.31 .10	25.9 1.0	16.67 .25	25.4 3.4	26.21 .12	49.6 1.1	39.89 .12	69.5 +0.2
25.5	62.40 .07	26.8 0.8	16.87 .14	28.8 3.4	26.32 .09	50.7 0.9	39.99 .09	69.7 0.0
Nov. 4.5	62.46 .04	27.5 0.6	16.96 +04	32.2 3.3	26.39 .06	51.5 0.8	40.06 .06	69.6 -0.1
14.4	62.49 +01	28.1 0.4	16.95 -07	35.4 3.1	26.44 +03	52.2 0.6	40.10 +03	69.5 0.3
24.4	62.49 -01	28.4 0.3	16.83 .17	38.3 2.8	26.45 .00	52.8 0.4	40.12 .00	69.1 0.4
Dec. 4.4	62.46 .04	28.6 +0.1	16.60 .27	40.9 2.4	26.43 -03	53.1 0.2	40.10 -03	68.7 0.5
14.3	62.40 .07	28.6 -0.1	16.29 .36	43.2 2.0	26.38 .06	53.2 +0.1	40.06 .05	68.2 0.5
24.3	62.32 .09	28.5 0.2	15.88 .44	45.0 1.5	26.31 .09	53.2 -0.1	40.00 .06	67.6 0.6
34.3	62.22 -11	28.1 -0.4	15.40 -51	46.2 +1.0	26.21 -11	53.0 -0.3	39.91 -10	67.0 -0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	* $\epsilon$ Cassiopeæ.		$\gamma$ Ceti.		$\alpha$ Ceti.		*48 Cephei (H.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 2 <sup>m</sup> 19	<sup>°</sup> +66 <sup>'</sup> 51	<sup>h</sup> 2 <sup>m</sup> 37	<sup>°</sup> +2 <sup>'</sup> 43	<sup>h</sup> 2 <sup>m</sup> 55	<sup>°</sup> +3 <sup>'</sup> 36	<sup>h</sup> 3 <sup>m</sup> 4	<sup>°</sup> +77 <sup>'</sup> 17
(Dec. 30.3)	<sup>s</sup> 9.02 -33	47.7 +1.3	<sup>s</sup> 3.47 -07	37.2 -0.8	<sup>s</sup> 58.96 -06	57.5 -0.7	<sup>s</sup> 66.28 -53	36.3 +2.1
Jan. 9.3	8.66 .36	48.8 0.8	3.38 .10	36.4 0.7	58.88 .09	56.7 0.7	65.68 .06	36.2 1.8
19.2	8.26 .49	49.4 +0.3	3.27 .19	35.8 0.6	58.78 .19	56.1 0.6	64.96 .76	39.6 1.1
29.2	7.82 .44	49.4 -0.3	3.15 .13	35.2 0.5	58.65 .13	55.4 0.6	64.16 .83	40.4 +0.5
Feb. 8.2	7.38 .44	48.9 0.8	3.01 .14	34.7 0.4	58.51 .14	54.9 0.5	63.31 .87	40.6 -0.1
18.2	6.94 .48	47.8 1.3	2.87 .14	34.3 0.3	58.37 .14	54.5 0.4	62.44 .86	40.2 0.7
28.2	6.54 .38	46.3 1.7	2.74 .13	34.0 -0.2	58.23 .14	54.2 0.2	61.60 .81	39.3 1.2
Mar. 10.1	6.19 .38	44.4 2.1	2.61 .11	33.9 0.0	58.09 .13	54.1 -0.1	60.82 .73	37.8 1.7
20.1	5.92 .34	42.2 2.4	2.51 .09	33.9 +0.1	57.98 .10	54.1 +0.1	60.15 .61	35.8 2.1
30.1	5.73 .14	39.7 2.5	2.44 .05	34.2 0.3	57.89 .07	54.2 0.3	59.61 .46	33.5 2.5
Apr. 9.1	5.64 -04	37.1 2.6	2.41 -01	34.6 0.5	57.84 -03	54.6 0.4	59.23 .39	30.9 2.7
19.0	5.65 +07	34.5 2.6	2.42 +03	35.2 0.7	57.83 +01	55.1 0.7	59.03 -11	28.2 2.8
29.0	5.78 .18	32.0 2.4	2.47 .07	36.1 1.0	57.87 .06	56.0 0.9	59.02 +08	25.3 2.8
May 9.0	6.01 .39	29.7 2.2	2.56 .12	37.1 1.2	57.94 .10	56.9 1.1	59.19 .37	22.5 2.8
18.9	6.35 .38	27.6 1.9	2.70 .16	38.4 1.4	58.07 .15	58.0 1.2	59.55 .45	19.8 2.6
28.9	6.78 .47	25.9 1.5	2.89 .20	39.8 1.5	58.24 .19	59.4 1.4	60.09 .68	17.4 2.3
June 7.9	7.29 .55	24.5 1.1	3.11 .24	41.4 1.7	58.44 .22	60.9 1.6	60.79 .77	15.3 2.0
17.9	7.87 .60	23.6 0.7	3.36 .27	43.1 1.7	58.68 .25	62.5 1.7	61.62 .90	13.5 1.6
27.8	8.49 .65	23.1 -0.2	3.64 .29	44.9 1.8	58.95 .28	64.2 1.7	62.58 1.00	12.1 1.2
July 7.8	9.16 .68	23.1 +0.2	3.94 .30	46.7 1.8	59.24 .30	65.9 1.7	63.63 1.09	11.2 0.7
17.8	9.84 .69	23.6 0.7	4.24 .31	48.5 1.7	59.55 .31	67.6 1.7	64.74 1.14	10.7 -0.2
27.7	10.53 .68	24.5 1.1	4.55 .31	50.2 1.6	59.85 .31	69.2 1.6	65.90 1.17	10.8 +0.3
Aug. 6.7	11.20 .67	25.9 1.5	4.86 .30	51.8 1.5	60.16 .31	70.8 1.5	67.08 1.18	11.2 0.7
16.7	11.85 .64	27.6 1.9	5.16 .29	53.2 1.3	60.47 .30	72.2 1.3	68.25 1.16	12.2 1.2
26.7	12.47 .60	29.7 2.2	5.45 .27	54.4 1.1	60.76 .28	73.3 1.1	69.40 1.12	13.6 1.6
Sept. 5.6	13.04 .55	32.1 2.5	5.71 .25	55.3 0.8	61.03 .28	74.3 0.8	70.49 1.07	15.4 2.0
15.6	13.57 .49	34.8 2.8	5.95 .23	56.0 0.6	61.28 .24	75.0 0.6	71.52 .99	17.6 2.3
25.6	14.02 .43	37.6 3.0	6.16 .20	56.5 0.3	61.51 .22	75.4 0.3	72.47 .90	20.1 2.6
Oct. 5.6	14.41 .35	40.7 3.1	6.35 .17	56.6 +0.1	61.72 .19	75.6 +0.1	73.31 .79	22.8 2.9
15.5	14.73 .28	43.8 3.2	6.51 .14	56.6 -0.2	61.89 .16	75.5 -0.2	74.04 .68	25.8 3.1
25.5	14.97 .20	46.9 3.1	6.64 .11	56.3 0.4	62.04 .13	75.3 0.4	74.64 .53	29.0 3.2
Nov. 4.5	15.13 .12	50.0 3.1	6.74 .08	55.8 0.5	62.16 .10	74.8 0.5	75.09 .38	32.3 3.3
14.4	15.20 +0.3	53.1 2.9	6.81 .05	55.2 0.7	62.25 .07	74.2 0.7	75.39 .21	35.6 3.3
24.4	15.19 -0.5	55.9 2.7	6.85 +0.2	54.5 0.7	62.31 .04	73.5 0.7	75.52 +0.5	38.9 3.2
Dec. 4.4	15.10 .14	58.5 2.4	6.85 -0.1	53.7 0.8	62.34 +0.1	72.7 0.8	75.48 -1.2	42.0 3.0
14.4	14.92 .22	60.7 2.0	6.83 .03	52.9 0.8	62.33 -0.2	71.9 0.8	75.28 .29	44.9 2.7
24.3	14.67 .29	62.6 1.6	6.79 .06	52.1 0.8	62.29 .05	71.1 0.8	74.91 .44	47.5 2.4
34.3	14.34 -3.5	63.9 +1.2	6.71 -0.9	51.3 -0.7	62.23 -0.8	70.3 -0.8	74.39 -5.9	49.6 +1.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\zeta$ Arietis.			$\alpha$ Persei.			$\delta$ Persei.			$\eta$ Tauri.		
	Right Ascension.		Declination North.	Right Ascension.		Declination North.	Right Ascension.		Declination North.	Right Ascension.		Declination North.
	h	m		h	m		h	m		h	m	
	3	7	+20° 35'	3	15	+49° 25'	3	34	+47° 23'	3	40	+23° 43'
(Dec. 30.4)	58.69	-.06	54.5 -0.1	43.68	-.11	61.8 +1.3	21.15	-.08	72.4 +1.3	19.58	-.04	58.4 +0.1
Jan. 9.3	58.61	.09	54.3 0.2	43.55	.15	62.8 0.8	21.04	.13	73.5 0.9	19.53	.07	58.4 0.0
19.3	58.51	.12	54.0 0.3	43.38	.19	63.5 0.5	20.90	.17	74.2 0.6	19.44	.11	58.3 -0.1
29.3	58.38	.14	53.7 0.4	43.17	.22	63.7 +0.1	20.71	.20	74.6 +0.2	19.31	.14	58.1 0.2
Feb. 8.2	58.23	.15	53.2 0.5	42.93	.24	63.6 -0.3	20.50	.23	74.6 -0.1	19.17	.16	57.8 0.3
18.2	58.08	.16	52.7 0.6	42.68	.25	63.2 0.7	20.25	.24	74.3 0.5	19.01	.17	57.4 0.4
28.2	57.92	.15	52.0 0.6	42.44	.24	62.3 1.0	20.01	.24	73.7 0.8	18.84	.17	56.9 0.5
Mar. 10.2	57.77	.14	51.4 0.6	42.21	.22	61.1 1.3	19.78	.23	72.7 1.1	18.67	.16	56.3 0.6
20.1	57.65	.11	50.8 0.6	42.00	.18	59.7 1.5	19.57	.19	71.4 1.3	18.53	.14	55.7 0.6
30.1	57.55	.08	50.2 0.6	41.84	.14	58.1 1.7	19.40	.15	70.0 1.5	18.40	.11	55.0 0.6
Apr. 9.1	57.49	-.04	49.7 0.5	41.74	.08	56.3 1.8	19.28	.10	68.4 1.6	18.31	.07	54.4 0.6
19.1	57.47	+0.1	49.3 0.3	41.69	-.01	54.5 1.8	19.21	-.04	66.7 1.7	18.27	-.03	53.9 0.5
29.0	57.50	.05	49.0 -0.2	41.71	+0.5	52.7 1.8	19.21	+0.3	65.0 1.7	18.26	+0.2	53.4 0.4
May 9.0	57.58	.10	48.9 0.0	41.80	.12	51.0 1.6	19.27	.10	63.4 1.5	18.31	.07	53.1 0.2
19.0	57.71	.15	49.1 +0.2	41.95	.19	49.5 1.4	19.40	.16	62.0 1.4	18.41	.12	53.0 -0.1
28.9	57.88	.19	49.4 0.5	42.18	.25	48.2 1.3	19.59	.23	60.7 1.2	18.56	.17	53.0 +0.1
June 7.9	58.10	.23	50.0 0.7	42.46	.31	47.1 0.9	19.84	.28	59.6 0.9	18.75	.21	53.2 0.3
17.9	58.35	.27	50.7 0.8	42.79	.35	46.4 0.6	20.15	.33	58.8 0.6	18.98	.25	53.6 0.5
27.9	58.63	.30	51.7 1.0	43.16	.39	46.0 -0.3	20.49	.37	58.3 -0.3	19.25	.28	54.2 0.7
July 7.8	58.94	.32	52.8 1.3	43.57	.42	45.9 +0.1	20.88	.40	58.1 0.0	19.54	.31	55.0 0.8
17.8	59.26	.33	54.0 1.3	44.01	.44	46.1 0.4	21.29	.42	58.2 +0.2	19.86	.32	55.9 1.0
27.8	59.59	.33	55.3 1.3	44.45	.45	46.7 0.7	21.71	.43	58.6 0.5	20.18	.33	56.9 1.0
Aug. 6.8	59.92	.33	56.6 1.4	44.90	.45	47.5 1.0	22.15	.44	59.3 0.8	20.52	.33	58.0 1.1
16.7	60.24	.32	58.0 1.4	45.35	.44	48.7 1.3	22.58	.43	60.2 1.0	20.85	.33	59.1 1.1
26.7	60.56	.31	59.3 1.3	45.79	.43	50.0 1.5	23.01	.42	61.4 1.2	21.18	.32	60.3 1.1
Sept. 5.7	60.86	.29	60.6 1.2	46.20	.41	51.6 1.7	23.42	.40	62.7 1.4	21.50	.31	61.4 1.1
15.6	61.14	.27	61.8 1.1	46.60	.38	53.4 1.8	23.82	.38	64.2 1.6	21.80	.29	62.4 1.0
25.6	61.39	.24	62.9 1.0	46.96	.35	55.3 2.0	24.19	.36	65.9 1.7	22.08	.27	63.4 0.9
Oct. 5.6	61.62	.22	63.8 0.9	47.29	.31	57.3 2.1	24.53	.33	67.7 1.8	22.35	.25	64.3 0.8
15.6	61.83	.19	64.6 0.7	47.59	.27	59.4 2.1	24.84	.29	69.6 1.9	22.59	.23	65.1 0.7
25.5	62.00	.16	65.3 0.6	47.84	.23	61.6 2.1	25.11	.25	71.5 1.9	22.80	.20	65.8 0.6
Nov. 4.5	62.15	.13	65.9 0.5	48.05	.19	63.7 2.1	25.34	.21	73.4 1.9	22.98	.17	66.4 0.5
14.5	62.26	.10	66.3 0.4	48.22	.14	65.8 2.0	25.52	.16	75.3 1.9	23.13	.14	66.9 0.5
24.5	62.35	.06	66.6 0.2	48.33	.09	67.8 1.9	25.66	.11	77.2 1.8	23.25	.10	67.3 0.4
Dec. 4.4	62.39	+0.3	66.8 +0.1	48.39	+0.3	69.6 1.8	25.75	.06	78.9 1.7	23.34	.06	67.7 0.3
14.4	62.41	.00	66.9 0.0	48.39	-.02	71.3 1.6	25.79	+0.1	80.5 1.5	23.38	+0.2	67.9 0.2
24.4	62.38	-.04	66.9 -0.1	48.35	.07	72.8 1.3	25.77	-.05	81.9 1.3	23.38	-.01	68.1 +0.1
34.4	62.32	-.08	66.7 -0.2	48.25	-.12	74.0 +1.0	25.69	-.09	83.1 +1.1	23.35	-.06	68.1 0.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\zeta$ Persei.		$\gamma^1$ Eridani.		$\gamma$ Tauri.		$\epsilon$ Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 3 <sup>m</sup> 46	+31° 31'	<sup>h</sup> 3 <sup>m</sup> 52	-13° 50'	<sup>h</sup> 4 <sup>m</sup> 12	+15° 20'	<sup>h</sup> 4 <sup>m</sup> 21	+18° 54'
(Dec. 30.4)	33.82 -.04	35.1 +0.5	24.95 -.05	70.0 -1.6	56.57 -.01	12.0 -0.3	35.26 .00	48.2 -0.2
Jan. 9.3	33.76 .08	35.5 0.3	24.88 .08	71.4 1.4	56.54 .05	11.6 0.3	35.24 -.04	48.1 0.2
19.3	33.67 .11	35.7 +0.1	24.79 .11	72.7 1.1	56.48 .08	11.3 0.3	35.17 .06	47.9 0.2
29.3	33.54 .15	35.7 0.0	24.66 .14	73.7 0.9	56.38 .12	11.0 0.3	35.07 .12	47.7 0.2
Feb. 8.3	33.38 .17	35.6 -0.2	24.51 .16	74.4 0.6	56.24 .14	10.6 0.4	34.95 .14	47.4 0.3
18.2	33.20 .18	35.2 0.4	24.34 .17	74.9 -0.3	56.09 .16	10.2 0.4	34.79 .16	47.1 0.3
28.2	33.02 .18	34.7 0.6	24.17 .17	75.0 0.0	55.93 .16	9.9 0.3	34.63 .17	46.8 0.3
Mar. 10.2	32.84 .17	34.1 0.7	24.00 .17	74.8 +0.3	55.77 .16	9.6 0.3	34.46 .17	46.4 0.4
20.2	32.67 .15	33.3 0.8	23.84 .15	74.4 0.6	55.61 .15	9.2 0.3	34.30 .15	46.1 0.4
30.1	32.54 .12	32.4 0.9	23.70 .12	73.6 0.9	55.47 .12	9.0 0.2	34.15 .13	45.7 0.3
Apr. 9.1	32.43 .08	31.4 0.9	23.60 .09	72.6 1.2	55.36 .09	8.8 0.2	34.04 .10	45.4 0.3
19.1	32.38 -.03	30.5 0.9	23.52 .05	71.3 1.4	55.20 .05	8.6 -0.1	33.96 .06	45.1 0.2
29.0	32.37 +0.2	29.7 0.8	23.49 -.01	69.8 1.6	55.26 -.01	8.6 +0.1	33.92 -.02	44.9 -0.1
May 9.0	32.41 .07	28.9 0.7	23.50 +0.3	68.0 1.9	55.27 +0.4	8.8 0.2	33.92 +0.3	44.8 0.0
19.0	32.51 .12	28.3 0.5	23.56 .08	66.1 2.0	55.35 .08	9.0 0.4	33.98 .08	44.9 +0.1
29.0	32.66 .17	27.8 0.4	23.66 .12	64.0 2.2	55.44 .13	9.5 0.5	34.08 .12	45.1 0.3
June 7.9	32.86 .22	27.6 -0.1	23.81 .17	61.8 2.2	55.59 .17	10.0 0.6	34.23 .17	45.4 0.4
17.9	33.10 .26	27.5 +0.1	23.99 .20	59.5 2.3	55.78 .21	10.8 0.6	34.42 .21	45.9 0.5
27.9	33.38 .29	27.7 0.3	24.21 .24	57.2 2.2	56.01 .24	11.6 0.9	34.64 .24	46.5 0.7
July 7.9	33.69 .32	28.1 0.5	24.46 .26	55.0 2.1	56.27 .27	12.6 1.0	34.90 .27	47.2 0.8
17.8	34.02 .34	28.6 0.6	24.74 .28	53.0 2.0	56.55 .29	13.6 1.0	35.18 .29	48.1 0.9
27.8	34.36 .35	29.4 0.8	25.02 .29	51.1 1.7	56.85 .30	14.7 1.1	35.48 .31	49.0 0.9
Aug. 6.8	34.72 .36	30.3 0.9	25.32 .30	49.5 1.5	57.16 .31	15.7 1.0	35.79 .32	49.9 0.9
16.7	35.08 .35	31.2 1.0	25.62 .30	48.2 1.1	57.47 .32	16.7 1.0	36.11 .32	50.8 0.9
26.7	35.43 .35	32.3 1.1	25.92 .29	47.2 0.8	57.79 .31	17.7 0.9	36.43 .32	51.6 0.8
Sept. 5.7	35.77 .33	33.5 1.1	26.21 .29	46.6 +0.4	58.10 .30	18.5 0.8	36.75 .31	52.4 0.7
15.7	36.09 .32	34.6 1.2	26.49 .27	46.4 0.0	58.40 .29	19.2 0.6	37.06 .30	53.1 0.6
25.6	36.40 .30	35.8 1.1	26.75 .25	46.7 -0.4	58.68 .28	19.8 0.5	37.36 .29	53.7 0.5
Oct. 5.6	36.69 .28	36.9 1.1	27.00 .23	47.3 0.8	58.95 .26	20.2 0.3	37.64 .27	54.2 0.4
15.6	36.95 .25	38.0 1.1	27.21 .20	48.2 1.1	59.21 .24	20.4 +0.2	37.90 .25	54.5 0.3
25.6	37.19 .22	39.1 1.0	27.41 .18	49.5 1.4	59.44 .22	20.5 0.0	38.14 .23	54.8 0.2
Nov. 4.5	37.39 .19	40.1 1.0	27.57 .15	51.1 1.6	59.64 .19	20.5 -0.1	38.36 .20	54.9 +0.1
14.5	37.56 .15	41.0 0.9	27.70 .12	52.8 1.8	59.81 .16	20.4 0.2	38.55 .17	55.0 0.0
24.5	37.69 .11	41.9 0.8	27.80 .08	54.6 1.9	59.96 .13	20.1 0.2	38.70 .14	54.9 -0.1
Dec. 4.4	37.79 .07	42.7 0.8	27.87 .05	56.5 1.9	60.07 .09	19.9 0.3	38.83 .10	54.8 0.1
14.4	37.84 +0.3	43.5 0.7	27.90 +0.1	58.4 1.8	60.15 .05	19.6 0.3	38.91 .06	54.7 0.1
24.4	37.85 -.01	44.1 0.5	27.89 -.03	60.2 1.7	60.18 +0.1	19.2 0.3	38.96 +0.2	54.6 0.1
34.4	37.82 -.06	44.5 +0.3	27.84 -.07	61.8 -1.5	60.17 -.03	18.9 -0.3	38.96 -.02	54.4 -0.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Tauri. (Aldebaran)		*9 Camelopardalis.		$\epsilon$ Aurigæ.		11 Orionis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 4 <sup>m</sup> 28	+16° 15'	<sup>h</sup> 4 <sup>m</sup> 42	+66° 8'	<sup>h</sup> 4 <sup>m</sup> 49	+32° 58'	<sup>h</sup> 4 <sup>m</sup> 57	+15° 14'
(Dec. 30.4)	60.86 +.01	61.7 -0.3	6.07 -.05	18.9 +2.3	9.38 +.03	32.6 +0.6	41.63 +.02	10.4 -0.4
Jan. 9.4	60.84 -.04	61.4 0.3	5.97 .15	21.1 2.1	9.38 -.03	33.2 0.6	41.64 -.02	10.0 0.4
19.4	60.79 .08	61.1 0.3	5.78 .94	23.0 1.8	9.33 .07	33.7 0.4	41.60 .06	9.7 0.3
29.3	60.69 .11	60.8 0.3	5.50 .32	24.6 1.4	9.24 .11	34.1 0.3	41.52 .09	9.4 0.3
Feb. 8.3	60.57 .14	60.5 0.3	5.14 .39	25.7 0.9	9.10 .15	34.4 +0.2	41.41 .13	9.1 0.3
18.3	60.42 .16	60.2 0.3	4.73 .43	26.4 +0.5	8.93 .18	34.4 0.0	41.27 .15	8.8 0.2
28.2	60.25 .17	59.9 0.3	4.29 .45	26.6 -0.1	8.75 .19	34.3 -0.2	41.11 .17	8.6 0.2
Mar. 10.2	60.09 .17	59.5 0.3	3.84 .45	26.3 0.6	8.55 .20	34.1 0.4	40.94 .17	8.3 0.2
20.2	59.92 .16	59.2 0.3	3.40 .42	25.5 1.0	8.36 .19	33.6 0.5	40.77 .16	8.1 0.2
30.2	59.78 .13	59.0 0.3	3.00 .38	24.3 1.4	8.18 .17	33.0 0.7	40.62 .15	7.9 0.2
Apr. 9.1	59.66 .10	58.7 0.2	2.65 .31	22.7 1.8	8.03 .13	32.3 0.8	40.48 .12	7.8 -0.1
19.1	59.57 .07	58.6 -0.1	2.38 .23	20.8 2.0	7.91 .09	31.5 0.8	40.38 .09	7.7 0.0
29.1	59.52 -.02	58.5 0.0	2.20 .13	18.6 2.2	7.84 -.05	30.7 0.8	40.31 -.05	7.7 0.0
May 9.1	59.52 +.02	58.6 +0.1	2.11 -.03	16.3 2.4	7.82 .00	29.9 0.8	40.28 .00	7.8 +0.1
19.0	59.57 .07	58.8 0.2	2.13 +.07	13.9 2.4	7.85 +.06	29.1 0.7	40.30 +.04	8.0 0.3
29.0	59.66 .12	59.1 0.4	2.25 .17	11.5 2.3	7.94 .11	28.4 0.6	40.36 .09	8.3 0.4
June 8.0	59.80 .16	59.5 0.5	2.47 .27	9.3 2.2	8.07 .16	27.8 0.5	40.47 .13	8.8 0.5
17.9	59.98 .20	60.1 0.7	2.79 .36	7.1 2.0	8.26 .20	27.4 0.4	40.62 .17	9.3 0.6
27.9	60.20 .23	60.9 0.8	3.20 .45	5.2 1.8	8.48 .25	27.0 0.2	40.81 .21	10.0 0.7
July 7.9	60.44 .26	61.7 0.9	3.68 .52	3.5 1.5	8.75 .28	26.9 -0.1	41.04 .24	10.7 0.8
17.9	60.72 .28	62.6 0.9	4.23 .58	2.2 1.2	9.04 .31	26.9 +0.1	41.29 .26	11.5 0.8
27.8	61.01 .30	63.5 0.9	4.83 .62	1.2 0.9	9.36 .33	27.0 0.2	41.56 .28	12.3 0.8
Aug. 6.8	61.32 .31	64.5 0.9	5.47 .66	0.5 0.5	9.70 .34	27.3 0.3	41.86 .30	13.1 0.8
16.8	61.63 .31	65.4 0.9	6.14 .68	0.1 -0.1	10.05 .35	27.7 0.4	42.16 .30	13.9 0.7
26.8	61.94 .31	66.2 0.8	6.83 .69	0.2 +0.2	10.40 .36	28.2 0.5	42.46 .31	14.6 0.6
Sept. 5.7	62.25 .31	66.9 0.7	7.52 .69	0.5 0.5	10.76 .35	28.7 0.6	42.77 .31	15.1 0.5
15.7	62.56 .30	67.6 0.5	8.20 .68	1.3 0.9	11.11 .35	29.3 0.6	43.08 .31	15.6 0.4
25.7	62.85 .29	68.0 0.4	8.87 .65	2.3 1.2	11.45 .34	29.9 0.6	43.39 .30	15.9 0.2
Oct. 5.6	63.13 .27	68.4 0.3	9.51 .62	3.7 1.5	11.79 .33	30.6 0.6	43.68 .29	16.1 +0.1
15.6	63.40 .25	68.6 +0.1	10.11 .58	5.4 1.8	12.10 .31	31.2 0.7	43.96 .27	16.1 -0.1
25.6	63.64 .23	68.6 0.0	10.67 .53	7.3 2.0	12.40 .28	31.9 0.7	44.22 .25	15.9 0.2
Nov. 4.6	63.86 .21	68.6 -0.1	11.17 .47	9.4 2.2	12.67 .26	32.5 0.7	44.46 .23	15.7 0.3
14.5	64.05 .18	68.4 0.2	11.60 .40	11.8 2.4	12.92 .23	33.2 0.7	44.68 .20	15.4 0.4
24.5	64.22 .15	68.2 0.2	11.95 .31	14.2 2.5	13.12 .19	33.9 0.7	44.87 .17	15.0 0.4
Dec. 4.5	64.35 .11	67.9 0.3	12.22 .22	16.8 2.6	13.29 .15	34.7 0.7	45.03 .14	14.5 0.4
14.5	64.44 .07	67.6 0.3	12.38 .12	19.3 2.5	13.42 .10	35.4 0.7	45.14 .10	14.1 0.4
24.4	64.48 +.03	67.4 0.3	12.45 +.01	21.8 2.4	13.50 +.05	36.0 0.7	45.22 .05	13.7 0.4
34.4	64.49 -.01	67.1 -0.2	12.41 -.09	24.2 +2.2	13.52 .00	36.7 +0.6	45.25 +.01	13.3 -0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Aurigæ. ( <i>Capella</i> .)		$\beta$ Orionis. ( <i>Rigel</i> .)		$\beta$ Tauri.		*Groombridge 966.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 5 7	+45° 52'	h m 5 8	-8° 20'	h m 5 18	+28° 30'	h m 5 23	+74° 57'
(Dec. 30.4)	48.12 +.05	32.7 +1.4	45.49 +.09	30.1 -1.7	41.11 +.05	20.3 +0.4	40.64 +.02	45.7 +2.8
Jan. 9.4	48.14 -.02	34.0 1.3	45.49 -.02	31.7 1.5	41.14 .00	20.6 0.3	40.58 -.14	48.4 2.6
19.4	48.08 .08	35.2 1.1	45.45 .06	33.2 1.3	41.12 -.04	21.0 0.3	40.36 .30	50.9 2.4
29.4	47.97 .14	36.2 0.9	45.37 .10	34.4 1.1	41.05 .09	21.2 0.3	39.98 .45	53.1 2.0
Feb. 8.3	47.82 .18	37.0 0.6	45.25 .13	35.4 0.9	40.94 .13	21.5 0.3	39.47 .57	54.9 1.6
18.3	47.62 .22	37.5 +0.3	45.11 .16	36.2 0.6	40.79 .16	21.6 +0.1	38.85 .68	56.2 1.1
28.3	47.39 .24	37.7 0.0	44.94 .17	36.7 0.4	40.62 .18	21.6 0.0	38.16 .72	57.0 +0.5
Mar. 10.2	47.14 .25	37.5 -0.3	44.76 .18	36.9 -0.1	40.43 .19	21.5 -0.2	37.43 .74	57.3 0.0
20.2	46.90 .24	37.1 0.6	44.59 .17	36.9 +0.1	40.25 .19	21.2 0.3	36.69 .73	57.0 -0.5
30.2	46.67 .21	36.4 0.8	44.42 .16	36.6 0.4	40.07 .17	20.9 0.4	35.98 .68	56.2 1.0
Apr. 9.2	46.47 .18	35.5 1.0	44.27 .14	36.1 0.6	39.91 .15	20.4 0.5	35.33 .60	55.0 1.5
19.1	46.31 .14	34.3 1.2	44.15 .11	35.4 0.9	39.78 .11	19.9 0.5	34.78 .50	53.2 1.9
29.1	46.20 .08	33.0 1.4	44.06 .07	34.4 1.1	39.69 .07	19.3 0.5	34.34 .37	51.1 2.3
May 9.1	46.14 -.02	31.6 1.4	44.01 -.03	33.2 1.3	39.64 -.02	18.8 0.5	34.03 .23	48.7 2.5
19.1	46.15 +.02	30.2 1.4	44.00 +.01	31.8 1.5	39.64 +.03	18.2 0.5	33.88 -.08	46.1 2.7
29.0	46.22 .10	28.7 1.4	44.04 .06	30.2 1.7	39.69 .07	17.8 0.4	33.88 +.08	43.4 2.7
June 8.0	46.35 .16	27.4 1.3	44.12 .10	28.5 1.8	39.79 .12	17.3 0.4	34.03 .23	40.7 2.7
18.0	46.53 .21	26.1 1.2	44.24 .14	26.7 1.8	39.94 .17	17.0 0.2	34.33 .38	38.1 2.6
27.9	46.77 .26	25.0 1.0	44.40 .18	24.8 1.9	40.13 .21	16.8 -0.1	34.78 .51	35.5 2.5
July 7.9	47.06 .31	24.0 0.9	44.59 .21	22.9 1.8	40.36 .24	16.8 0.0	35.36 .64	33.1 2.2
17.9	47.39 .34	23.2 0.7	44.81 .23	21.1 1.8	40.62 .27	16.8 0.0	36.06 .75	31.0 2.0
27.9	47.75 .37	22.7 0.5	45.06 .26	19.4 1.6	40.90 .30	16.9 +0.1	36.86 .84	29.2 1.7
Aug. 6.8	48.13 .40	22.3 0.3	45.32 .27	17.9 1.4	41.21 .31	17.0 0.2	37.74 .92	27.7 1.3
16.8	48.53 .41	22.1 -0.1	45.60 .28	16.6 1.2	41.53 .33	17.3 0.3	38.69 .98	26.6 0.9
26.8	48.95 .42	22.1 +0.1	45.89 .29	15.6 0.9	41.86 .34	17.5 0.3	39.69 1.02	25.9 0.6
Sept. 5.8	49.37 .42	22.3 0.3	46.18 .29	14.9 0.5	42.20 .34	17.8 0.3	40.73 1.04	25.5 -0.2
15.7	49.79 .42	22.7 0.5	46.47 .29	14.5 +0.2	42.54 .34	18.1 0.3	41.78 1.05	25.5 +0.2
25.7	50.21 .41	23.2 0.6	46.76 .28	14.6 -0.2	42.88 .33	18.4 0.3	42.83 1.04	26.0 0.6
Oct. 5.7	50.61 .40	23.9 0.7	47.04 .27	15.0 0.6	43.21 .33	18.7 0.3	43.85 1.01	26.8 1.0
15.6	51.00 .38	24.8 0.9	47.31 .26	15.7 0.9	43.53 .31	19.0 0.2	44.84 .96	28.0 1.4
25.6	51.37 .36	25.7 1.0	47.56 .24	16.8 1.2	43.83 .30	19.2 0.2	45.78 .90	29.6 1.7
Nov. 4.6	51.71 .33	26.8 1.2	47.79 .22	18.2 1.5	44.12 .27	19.5 0.2	46.63 .81	31.5 2.1
14.6	52.02 .29	28.0 1.3	48.00 .19	19.8 1.7	44.38 .25	19.7 0.3	47.39 .70	33.7 2.4
24.5	52.29 .24	29.3 1.3	48.17 .16	21.5 1.8	44.61 .21	20.0 0.3	48.04 .58	36.2 2.6
Dec. 4.5	52.51 .19	30.7 1.4	48.32 .13	23.4 1.9	44.81 .17	20.3 0.3	48.55 .44	38.9 2.7
14.5	52.67 .14	32.1 1.4	48.43 .09	25.2 1.8	44.96 .13	20.6 0.3	48.91 .28	41.7 2.8
24.5	52.78 .08	33.5 1.4	48.49 +.05	27.0 1.8	45.07 .08	20.9 0.3	49.11 +.12	44.6 2.8
34.4	52.83 +.01	34.9 +1.3	48.52 .00	28.8 -1.7	45.13 +.03	21.3 +0.3	49.15 -.05	47.3 +2.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Orionis.		$\alpha$ Leporis.		$\epsilon$ Orionis.		$\alpha$ Columbæ.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 5 <sup>m</sup> 25	<sup>°</sup> 0 <sup>'</sup> 23	<sup>h</sup> 5 <sup>m</sup> 27	<sup>°</sup> 17 <sup>'</sup> 54	<sup>h</sup> 5 <sup>m</sup> 30	<sup>°</sup> 1 <sup>'</sup> 16	<sup>h</sup> 5 <sup>m</sup> 35	<sup>°</sup> 34 <sup>'</sup> 7
(Dec. 30.4)	51.72 +.04	20.5 -1.4	25.83 +.03	33.1 -2.2	6.60 +.05	45.9 -1.4	18.36 +.01	80.2 -2.2
Jan. 9.4	51.74 -.00	21.8 1.2	25.84 -.02	35.3 2.0	6.63 .00	47.2 1.3	18.34 -.04	83.0 2.7
19.4	51.72 -.04	22.9 1.1	25.80 .06	37.2 1.8	6.61 -.04	48.4 1.1	18.27 .09	85.5 2.4
29.4	51.66 .08	23.9 0.9	25.71 .10	38.8 1.5	6.55 .08	49.5 0.9	18.15 .14	87.7 2.0
Feb. 8.3	51.56 .12	24.7 0.7	25.59 .14	40.2 1.2	6.45 .12	50.3 0.8	17.99 .18	89.5 1.6
18.3	51.42 .14	25.3 0.5	25.44 .16	41.3 0.9	6.32 .14	51.0 0.6	17.80 .21	90.9 1.2
28.3	51.27 .16	25.8 0.4	25.26 .18	42.0 0.5	6.16 .16	51.5 0.4	17.58 .23	91.9 0.7
Mar. 10.3	51.10 .17	26.1 -0.2	25.07 .19	42.3 -0.2	6.00 .17	51.8 -0.2	17.34 .24	92.3 -0.2
20.2	50.93 .17	26.2 0.0	24.88 .19	42.3 +0.1	5.82 .17	51.9 0.0	17.10 .24	92.4 +0.2
30.2	50.76 .16	26.1 +0.2	24.69 .18	42.0 0.5	5.66 .16	51.8 +0.2	16.87 .23	92.0 0.6
Apr. 9.2	50.61 .14	25.8 0.3	24.52 .16	41.4 0.8	5.50 .14	51.5 0.4	16.65 .21	91.1 1.0
19.1	50.49 .11	25.4 0.5	24.38 .13	40.5 1.1	5.38 .11	51.1 0.5	16.46 .18	89.9 1.4
29.1	50.40 .07	24.7 0.7	24.27 .09	39.2 1.4	5.28 .08	50.4 0.7	16.30 .14	88.3 1.8
May 9.1	50.34 -.03	23.9 0.9	24.19 .06	37.7 1.6	5.22 -.04	49.6 0.9	16.18 .10	86.3 2.1
19.1	50.33 +.01	23.0 1.0	24.15 -.01	36.0 1.8	5.20 .00	48.6 1.1	16.10 -.05	84.0 2.4
29.0	50.36 .05	21.9 1.2	24.16 +.03	34.0 2.0	5.23 +.04	47.4 1.2	16.07 .00	81.5 2.6
June 8.0	50.43 .09	20.6 1.3	24.21 .07	31.9 2.2	5.29 .09	46.2 1.3	16.10 +.04	78.9 2.8
18.0	50.54 .13	19.3 1.4	24.31 .12	29.7 2.3	5.40 .13	44.8 1.4	16.16 .09	76.0 2.9
28.0	50.69 .17	17.9 1.4	24.44 .15	27.4 2.3	5.55 .16	43.3 1.5	16.28 .14	73.2 2.8
July 7.9	50.87 .20	16.4 1.4	24.62 .19	25.2 2.2	5.73 .19	41.9 1.5	16.44 .18	70.3 2.8
17.9	51.09 .23	15.0 1.4	24.82 .22	23.0 2.1	5.94 .22	40.4 1.4	16.63 .21	67.6 2.6
27.9	51.33 .25	13.6 1.3	25.05 .24	21.0 1.9	6.17 .25	39.0 1.3	16.86 .25	65.1 2.4
Aug. 6.8	51.58 .27	12.4 1.2	25.31 .26	19.2 1.7	6.43 .26	37.8 1.2	17.13 .27	62.9 2.1
16.8	51.86 .28	11.3 1.0	25.58 .28	17.6 1.4	6.70 .28	36.7 1.0	17.41 .28	61.0 1.7
26.8	52.14 .29	10.5 0.7	25.86 .29	16.4 1.0	6.98 .29	35.8 0.8	17.71 .31	59.6 1.2
Sept. 5.8	52.43 .29	9.8 0.5	26.15 .29	15.6 0.6	7.27 .29	35.2 0.5	18.03 .32	58.6 0.7
15.7	52.72 .29	9.5 +0.2	26.45 .30	15.3 +0.1	7.56 .29	34.8 +0.2	18.35 .32	58.2 +0.1
25.7	53.02 .29	9.5 -0.1	26.74 .29	15.4 -0.3	7.85 .29	34.8 -0.1	18.67 .32	58.4 -0.4
Oct. 5.7	53.30 .28	9.7 0.4	27.03 .28	15.9 0.7	8.14 .28	35.1 0.4	18.99 .31	59.0 1.0
15.7	53.58 .27	10.3 0.7	27.31 .27	16.9 1.2	8.42 .27	35.7 0.7	19.30 .30	60.3 1.5
25.6	53.84 .26	11.1 0.9	27.58 .25	18.3 1.6	8.69 .26	36.5 1.0	19.58 .28	62.0 2.0
Nov. 4.6	54.09 .24	12.2 1.2	27.82 .23	20.0 1.9	8.94 .24	37.7 1.2	19.85 .25	64.3 2.4
14.6	54.32 .21	13.4 1.3	28.04 .21	22.0 2.1	9.16 .21	39.0 1.4	20.08 .22	66.8 2.7
24.5	54.52 .18	14.8 1.4	28.23 .17	24.3 2.3	9.37 .19	40.4 1.5	20.28 .18	69.7 3.0
Dec. 4.5	54.68 .15	16.3 1.5	28.39 .14	26.6 2.4	9.54 .15	41.9 1.5	20.44 .14	72.7 3.1
14.5	54.81 .11	17.8 1.5	28.51 .10	29.0 2.4	9.67 .11	43.5 1.5	20.55 .09	75.8 3.1
24.5	54.90 .07	19.2 1.4	28.58 .05	31.4 2.3	9.76 .07	45.0 1.5	20.62 +.04	78.9 3.0
34.4	54.95 +.03	20.6 -1.3	28.61 +.01	33.7 -2.2	9.81 +.03	46.4 -1.4	20.63 -.02	81.8 -2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Orionis.		*22 Camelop. (H.)		$\mu$ Geminorum.		$\alpha$ Argus. (Canopus.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 5 <sup>m</sup> 48	<sup>°</sup> +7 <sup>'</sup> 22	<sup>h</sup> 6 <sup>m</sup> 5	<sup>°</sup> +69 <sup>'</sup> 21	<sup>h</sup> 6 <sup>m</sup> 15	<sup>°</sup> +22 <sup>'</sup> 34	<sup>h</sup> 6 <sup>m</sup> 21	<sup>°</sup> -52 <sup>'</sup> 37
(Dec. 30.5)	<sup>s</sup> 39.55 +.07	63.3 -1.0	<sup>s</sup> 36.12 +.15	40.0 +2.5	<sup>s</sup> 40.96 +.11	30.8 -0.1	<sup>s</sup> 18.63 +.02	46.2 -3.6
Jan. 9.5	39.60 +.03	62.4 0.9	36.21 +.03	42.5 2.5	41.05 .06	30.7 0.0	18.61 -.05	49.7 3.4
19.4	39.60 -.02	61.6 0.7	36.17 -.10	44.9 2.4	41.08 +.01	30.7 0.0	18.52 .12	53.0 3.1
29.4	39.56 .06	60.9 0.6	36.01 .32	47.2 2.1	41.06 -.04	30.8 +0.1	18.37 .19	55.9 2.8
Feb. 8.4	39.48 .10	60.4 0.5	35.74 .33	49.2 1.8	41.00 .09	30.9 0.1	18.15 .24	58.5 2.4
18.3	39.36 .13	59.9 0.4	35.36 .41	50.9 1.4	40.89 .12	31.0 0.1	17.88 .29	60.6 1.9
28.3	39.22 .16	59.6 0.3	34.91 .48	52.1 1.0	40.75 .15	31.1 +0.1	17.57 .32	62.3 1.4
Mar. 10.3	39.05 .17	59.3 0.2	34.41 .52	52.8 +0.5	40.59 .17	31.2 0.0	17.24 .35	63.5 0.9
20.3	38.88 .17	59.2 -0.1	33.88 .53	53.1 0.0	40.41 .18	31.2 0.0	16.88 .36	64.1 -0.4
30.2	38.71 .16	59.2 0.0	33.35 .52	52.8 -0.5	40.23 .18	31.2 -0.1	16.52 .36	64.2 +0.1
Apr. 9.2	38.56 .14	59.3 +0.1	32.85 .48	52.1 1.0	40.06 .16	31.1 0.1	16.17 .34	63.8 0.7
19.2	38.43 .12	59.5 0.2	32.40 .42	50.9 1.4	39.91 .14	31.0 0.2	15.85 .31	62.9 1.2
29.2	38.32 .09	59.8 0.4	32.02 .34	49.3 1.8	39.79 .10	30.8 0.2	15.55 .28	61.5 1.6
May 9.1	38.26 .05	60.2 0.5	31.73 .24	47.4 2.1	39.70 .07	30.6 0.2	15.30 .23	59.7 2.0
19.1	38.23 -.01	60.7 0.6	31.54 .14	45.2 2.3	39.65 -.02	30.4 0.2	15.09 .18	57.4 2.4
29.1	38.25 +.04	61.4 0.7	31.45 -.03	42.8 2.5	39.65 +.02	30.2 0.2	14.94 .12	54.9 2.7
June 8.0	38.30 .08	62.1 0.8	31.48 +.08	40.2 2.5	39.69 .06	30.1 0.1	14.85 -.06	52.1 2.9
18.0	38.40 .12	63.0 0.9	31.62 .19	37.7 2.5	39.78 .10	30.0 -0.1	14.82 .00	49.1 3.1
28.0	38.53 .15	63.9 0.9	31.87 .30	35.2 2.5	39.90 .14	29.9 0.0	14.85 +.06	45.9 3.2
July 8.0	38.71 .19	64.8 1.0	32.22 .40	32.8 2.4	40.06 .18	29.9 0.0	14.94 .12	42.7 3.2
17.9	38.91 .22	65.8 1.0	32.66 .49	30.5 2.2	40.26 .21	29.9 0.0	15.08 .18	39.6 3.1
27.9	39.14 .24	66.7 0.9	33.19 .56	28.4 2.0	40.49 .24	29.9 0.0	15.29 .23	36.6 2.9
Aug. 6.9	39.39 .26	67.6 0.8	33.78 .63	26.6 1.7	40.74 .26	30.0 0.0	15.54 .28	33.8 2.6
16.9	39.66 .28	68.4 0.7	34.44 .69	25.0 1.4	41.02 .28	30.0 0.0	15.84 .32	31.4 2.2
26.8	39.94 .29	69.0 0.5	35.15 .73	23.7 1.1	41.31 .30	30.0 0.0	16.17 .35	29.5 1.7
Sept. 5.8	40.23 .29	69.4 0.3	35.90 .76	22.8 0.8	41.61 .31	29.9 -0.1	16.54 .38	28.0 1.2
15.8	40.53 .30	69.6 +0.1	36.68 .78	22.2 0.4	41.93 .32	29.8 0.1	16.93 .40	27.2 +0.6
25.7	40.83 .30	69.6 -0.1	37.46 .79	21.9 -0.1	42.25 .32	29.6 0.2	17.34 .41	26.9 0.0
Oct. 5.7	41.12 .29	69.4 0.3	38.26 .79	22.1 +0.3	42.58 .33	29.4 0.3	17.75 .41	27.3 -0.7
15.7	41.41 .29	69.0 0.5	39.04 .77	22.6 0.7	42.90 .32	29.1 0.3	18.16 .40	28.3 1.3
25.7	41.69 .28	68.3 0.7	39.79 .74	23.4 1.0	43.22 .31	28.7 0.4	18.55 .38	29.9 1.9
Nov. 4.6	41.96 .26	67.5 0.9	40.50 .69	24.6 1.4	43.53 .30	28.3 0.4	18.92 .35	32.1 2.5
14.6	42.21 .24	66.6 1.0	41.17 .63	26.2 1.7	43.84 .28	27.9 0.4	19.25 .31	34.8 2.9
24.6	42.44 .21	65.5 1.1	41.76 .55	28.0 2.0	44.09 .25	27.5 0.4	19.53 .28	37.9 3.3
Dec. 4.6	42.63 .18	64.4 1.1	42.26 .45	30.2 2.2	44.33 .22	27.1 0.3	19.76 .20	41.3 3.5
14.5	42.79 .14	63.3 1.1	42.66 .35	32.5 2.4	44.53 .18	26.8 0.2	19.92 .13	44.9 3.6
24.5	42.91 .10	62.3 1.0	42.95 .23	35.0 2.5	44.70 .14	26.6 0.2	20.02 +.06	48.0 3.6
34.5	42.99 +.05	61.3 -0.9	43.12 +.10	37.5 +2.6	44.81 +.08	26.5 -0.1	20.05 .00	52.2 -3.5



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Geminorum.		$\alpha$ Canis Majoris. (Sirius.)		$\epsilon$ Canis Majoris.		$\delta$ Canis Majoris.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 6 30	<sup>m</sup> +16° 30'	<sup>h</sup> 6 39	<sup>m</sup> -16° 32'	<sup>h</sup> 6 53	<sup>m</sup> -28° 48'	<sup>h</sup> 7 3	<sup>m</sup> -26° 11'
(Dec. 30.5)	45.75 +.12	7.1 -0.5	51.06 +.10	63.7 -2.5	54.49 +.10	27.3 -3.1	30.50 +.12	63.0 -2.9
Jan. 9.5	45.84 .07	6.7 0.4	51.14 +.05	66.1 2.3	54.56 +.05	30.2 2.9	30.59 .06	65.9 2.8
19.4	45.89 +.02	6.3 0.3	51.16 .00	68.4 2.2	54.59 .00	33.1 2.7	30.63 +.01	68.6 2.6
29.4	45.89 -.03	6.0 0.2	51.14 -.05	70.4 1.9	54.56 -.05	35.6 2.4	30.62 -.04	71.2 2.4
Feb. 8.4	45.84 .07	5.8 0.1	51.07 .09	72.2 1.6	54.48 .10	37.9 2.1	30.55 .09	73.4 2.1
18.4	45.74 .11	5.7 -0.1	50.96 .13	73.6 1.3	54.36 .14	39.9 1.8	30.45 .13	75.3 1.8
28.3	45.61 .14	5.7 0.0	50.82 .16	74.8 1.0	54.20 .18	41.4 1.4	30.30 .16	76.9 1.4
Mar 10.3	45.46 .16	5.7 0.0	50.65 .18	75.6 0.7	54.01 .20	42.6 1.0	30.12 .19	78.1 1.0
20.3	45.29 .17	5.7 0.0	50.47 .19	76.2 -0.3	53.80 .21	43.4 0.5	29.93 .20	78.9 0.6
30.3	45.12 .17	5.7 0.0	50.28 .19	76.3 0.0	53.59 .21	43.7 -0.1	29.72 .21	79.3 -0.2
Apr. 9.2	44.95 .16	5.7 0.0	50.09 .18	76.2 +0.3	53.37 .21	43.7 +0.3	29.52 .20	79.3 +0.2
19.2	44.80 .14	5.7 0.0	49.92 .16	75.8 0.6	53.17 .19	43.2 0.6	29.32 .19	78.9 0.5
29.2	44.68 .11	5.8 0.0	49.77 .13	75.0 0.9	52.99 .17	42.4 1.0	29.15 .16	78.2 0.9
May 9.2	44.58 .08	5.8 +0.1	49.65 .10	74.0 1.1	52.84 .14	41.2 1.4	29.00 .13	77.1 1.3
19.1	44.53 -.04	5.9 0.1	49.57 .07	72.7 1.4	52.72 .10	39.6 1.7	28.88 .10	75.7 1.6
29.1	44.51 .00	6.1 0.1	49.52 -.03	71.2 1.6	52.64 .06	37.8 2.0	28.80 .06	74.0 1.8
June 8.1	44.53 +.04	6.2 0.2	49.51 +.01	69.5 1.8	52.59 -.02	35.7 2.2	28.75 -.02	72.1 2.0
18.0	44.60 .08	6.4 0.2	49.54 .05	67.7 1.9	52.59 +.02	33.4 2.4	28.75 +.01	69.9 2.2
28.0	44.70 .12	6.7 0.3	49.60 .09	65.7 2.0	52.63 .06	31.0 2.5	28.78 .05	67.6 2.3
July 8.0	44.85 .16	7.0 0.3	49.71 .12	63.7 2.0	52.71 .10	28.5 2.5	28.85 .09	65.3 2.4
18.0	45.02 .19	7.3 0.3	49.85 .15	61.8 1.9	52.83 .14	26.1 2.5	28.96 .13	62.9 2.3
27.9	45.23 .22	7.6 0.3	50.02 .19	59.9 1.8	52.99 .17	23.7 2.3	29.11 .16	60.6 2.2
Aug. 6.9	45.46 .24	7.8 0.2	50.22 .21	58.1 1.6	53.18 .20	21.4 2.1	29.29 .19	58.5 2.0
16.9	45.71 .26	8.0 0.2	50.44 .24	56.6 1.4	53.39 .23	19.4 1.8	29.50 .22	56.5 1.8
26.8	45.99 .28	8.1 +0.1	50.69 .26	55.4 1.1	53.64 .26	17.7 1.5	29.74 .25	54.9 1.4
Sept. 5.8	46.27 .29	8.2 0.0	50.95 .27	54.5 0.7	53.91 .28	16.5 1.1	29.99 .27	53.7 1.0
15.8	46.57 .30	8.1 -0.2	51.23 .28	54.0 +0.3	54.20 .30	15.6 +0.6	30.27 .29	52.9 0.6
25.8	46.88 .31	7.8 0.3	51.52 .29	53.9 -0.1	54.50 .31	15.3 0.0	30.57 .30	52.5 +0.1
Oct. 5.7	47.19 .31	7.4 0.4	51.82 .30	54.3 0.6	54.81 .32	15.6 -0.5	30.88 .31	52.7 -0.4
15.7	47.50 .31	6.9 0.6	52.12 .30	55.1 1.0	55.13 .32	16.3 1.0	31.19 .31	53.4 0.9
25.7	47.82 .31	6.3 0.7	52.41 .29	56.3 1.4	55.45 .31	17.6 1.5	31.50 .31	54.6 1.4
Nov. 4.7	48.12 .30	5.6 0.7	52.70 .28	58.0 1.8	55.76 .30	19.3 2.0	31.81 .30	56.3 1.9
14.6	48.41 .28	4.8 0.8	52.98 .28	60.0 2.1	56.05 .28	21.5 2.4	32.11 .29	58.4 2.3
24.6	48.68 .26	4.1 0.8	53.23 .24	62.2 2.3	56.32 .26	24.1 2.7	32.38 .26	60.9 2.6
Dec. 4.6	48.93 .23	3.3 0.7	53.45 .21	64.6 2.5	56.56 .22	26.9 2.9	32.63 .23	63.6 2.8
14.5	49.14 .19	2.6 0.7	53.64 .17	67.2 2.6	56.76 .18	29.9 3.0	32.84 .19	66.5 2.9
24.5	49.30 .15	1.9 0.6	53.79 .13	69.7 2.5	56.92 .13	32.9 3.1	33.01 .15	69.5 3.0
34.5	49.43 +.10	1.4 -0.5	53.90 +.08	72.2 -2.5	57.03 +.08	36.0 -3.0	33.13 +.10	72.4 -2.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Geminorum.		* Piazzi vii. 67.		$\alpha$ Geminorum. (Castor.)		$\alpha$ Canis Minoris. (Procyon.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 7 <sup>m</sup> 12	<sup>°</sup> +22 <sup>'</sup> 12	<sup>h</sup> 7 <sup>m</sup> 18	<sup>°</sup> +68 <sup>'</sup> 42	<sup>h</sup> 7 <sup>m</sup> 26	<sup>°</sup> +32 <sup>'</sup> 8	<sup>h</sup> 7 <sup>m</sup> 32	<sup>°</sup> +5 <sup>'</sup> 31
(Dec. 30.5)	56.30 +.17	13.9 -0.3	22.40 +.34	33.2 +2.3	55.12 +.20	66.7 +0.2	60.38 +.17	61.5 -1.5
Jan. 9.5	56.45 .12	13.6 -0.2	22.67 .22	35.6 2.4	55.30 .14	67.0 0.4	60.53 .12	60.1 1.3
19.5	56.54 .06	13.5 0.0	22.83 +.09	38.1 2.5	55.41 .09	67.5 0.6	60.63 .07	58.9 1.1
29.5	56.58 +.01	13.5 +0.1	22.85 -.04	40.6 2.5	55.47 +.03	68.2 0.7	60.68 +.02	57.9 0.9
Feb. 8.4	56.56 -.04	13.7 0.2	22.75 .16	43.0 2.3	55.47 -.03	68.8 0.7	60.67 -.03	57.0 0.8
18.4	56.50 .08	13.9 0.2	22.52 .27	45.2 2.1	55.42 .08	69.6 0.7	60.63 .07	56.4 0.6
28.4	56.40 .12	14.1 0.3	22.20 .37	47.1 1.7	55.31 .12	70.3 0.7	60.54 .11	55.9 0.4
Mar. 10.3	56.26 .15	14.4 0.3	21.80 .44	48.6 1.4	55.17 .16	70.9 0.7	60.42 .12	55.5 0.2
20.3	56.10 .17	14.7 0.2	21.33 .49	49.8 0.9	55.00 .18	71.5 0.5	60.27 .15	55.3 -0.1
30.3	55.92 .17	14.9 0.2	20.83 .51	50.4 +0.4	54.81 .19	71.9 0.3	60.11 .16	55.3 0.0
Apr. 9.3	55.75 .17	15.0 +0.1	20.32 .51	50.6 -0.1	54.62 .19	72.1 +0.1	59.95 .16	55.4 +0.1
19.2	55.58 .16	15.1 0.0	19.83 .48	50.2 0.6	54.44 .18	72.2 0.0	59.79 .15	55.5 0.2
29.2	55.44 .13	15.1 0.0	19.37 .43	49.4 1.0	54.27 .16	72.1 -0.2	59.65 .13	55.8 0.3
May 9.2	55.32 .10	15.1 0.0	18.97 .37	48.2 1.4	54.13 .12	71.9 0.3	59.52 .11	56.1 0.4
19.1	55.23 .07	15.0 -0.1	18.64 .28	46.6 1.8	54.02 .09	71.5 0.4	59.43 .08	56.6 0.5
29.1	55.18 -.03	14.9 0.1	18.41 .19	44.6 2.1	53.95 .05	71.0 0.6	59.37 .05	57.1 0.6
June 8.1	55.17 +.01	14.7 0.2	18.26 -.10	42.4 2.4	53.92 -.01	70.4 0.7	59.34 -.01	57.7 0.6
18.1	55.20 .05	14.6 0.2	18.21 .00	39.9 2.5	53.93 +.03	69.7 0.7	59.34 +.02	58.3 0.7
28.1	55.27 .09	14.4 0.2	18.27 +.10	37.3 2.6	53.98 .08	68.9 0.8	59.38 .06	59.0 0.7
July 8.0	55.37 .12	14.2 0.2	18.42 .20	34.7 2.7	54.08 .12	68.1 0.8	59.46 .09	59.7 0.7
18.0	55.52 .16	14.0 0.2	18.67 .29	32.0 2.6	54.22 .15	67.3 0.8	59.56 .12	60.4 0.7
28.0	55.69 .19	13.8 0.2	19.01 .38	29.4 2.6	54.39 .19	66.5 0.9	59.70 .15	61.1 0.6
Aug. 6.9	55.89 .22	13.6 0.3	19.44 .46	26.9 2.4	54.59 .22	65.6 0.9	59.86 .18	61.6 0.5
16.9	56.12 .24	13.3 0.3	19.93 .53	24.5 2.3	54.83 .25	64.7 0.9	60.05 .20	62.1 0.4
26.9	56.37 .26	12.9 0.4	20.50 .60	22.4 2.1	55.09 .27	63.8 0.9	60.27 .22	62.4 +0.2
Sept. 5.9	56.65 .28	12.5 0.5	21.13 .65	20.4 1.8	55.37 .30	62.9 0.9	60.51 .25	62.5 0.0
15.8	56.94 .30	12.0 0.6	21.81 .70	18.8 1.5	55.68 .32	62.0 0.9	60.76 .28	62.4 -0.2
25.8	57.24 .31	11.4 0.6	22.52 .73	17.4 1.2	56.01 .33	61.1 0.9	61.03 .28	62.1 0.5
Oct. 5.8	57.56 .32	10.7 0.7	23.27 .76	16.4 0.8	56.35 .35	60.2 0.9	61.32 .29	61.5 0.7
15.7	57.89 .33	9.9 0.8	24.03 .77	15.7 0.5	56.70 .36	59.4 0.9	61.62 .30	60.6 1.0
25.7	58.22 .33	9.1 0.8	24.80 .77	15.4 -0.1	57.06 .36	58.5 0.8	61.93 .31	59.6 1.2
Nov. 4.7	58.55 .33	8.3 0.8	25.57 .75	15.6 +0.3	57.42 .36	57.8 0.7	62.24 .31	58.3 1.4
14.7	58.87 .32	7.5 0.8	26.30 .72	16.1 0.7	57.78 .35	57.2 0.6	62.54 .30	56.8 1.5
24.6	59.18 .30	6.7 0.7	26.99 .67	17.0 1.1	58.12 .33	56.7 0.4	62.84 .29	55.3 1.6
Dec. 4.6	59.47 .27	6.0 0.7	27.63 .60	18.4 1.5	58.44 .31	56.3 0.2	63.11 .26	53.7 1.6
14.6	59.73 .24	5.4 0.5	28.18 .51	20.1 1.9	58.73 .27	56.2 -0.1	63.36 .23	52.1 1.6
24.6	59.94 .19	4.9 0.4	28.64 .40	22.1 2.1	58.98 .22	56.2 +0.1	63.57 .19	50.5 1.5
34.5	60.11 +.15	4.6 -0.2	28.99 +.29	24.3 +2.3	59.19 +.17	56.4 +0.3	63.75 +.15	49.1 -1.4

### APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Geminorum. (Pollux.)		$\phi$ Geminorum.		*3 Ursæ Majoris (H.)		15 Argus ( $\epsilon$ )	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 7 <sup>m</sup> 37	<sup>°</sup> +28 <sup>'</sup> 18	<sup>h</sup> 7 <sup>m</sup> 46	<sup>°</sup> +27 <sup>'</sup> 4	<sup>h</sup> 8 <sup>m</sup> 0	<sup>°</sup> +68 <sup>'</sup> 49	<sup>h</sup> 8 <sup>m</sup> 2	<sup>°</sup> -23 <sup>'</sup> 57
(Dec. 30.5)	<sup>s</sup> 57.25 +.20	<sup>"</sup> 59.9 -0.1	<sup>s</sup> 8.08 +.21	<sup>"</sup> 37.0 -0.2	<sup>s</sup> 50.86 +.44	<sup>"</sup> 33.2 +2.0	<sup>s</sup> 25.50 +.18	<sup>"</sup> 19.2 -3.0
Jan. 9.5	57.43 .15	59.9 +0.1	8.27 .16	36.9 0.0	51.25 .33	35.4 2.3	25.74 .13	22.1 2.9
19.5	57.55 .09	60.1 0.3	8.40 .10	37.0 +0.2	51.50 .19	37.7 2.5	25.85 .08	25.0 2.6
29.5	57.62 +.04	60.5 0.4	8.47 +.04	37.3 0.4	51.64 +.06	40.2 2.5	25.90 +.03	27.7 2.6
Feb. 8.4	57.62 -.02	61.0 0.5	8.49 -.01	37.7 0.5	51.64 -.06	42.8 2.5	25.90 -.02	30.1 2.3
18.4	57.58 .07	61.6 0.6	8.45 .06	38.2 0.5	51.51 .18	45.2 2.3	25.85 .07	32.3 2.0
28.4	57.49 .11	62.1 0.6	8.37 .10	38.8 0.6	51.27 .29	47.4 2.1	25.76 .11	34.2 1.7
Mar. 10.3	57.36 .15	62.7 0.5	8.25 .14	39.3 0.5	50.93 .38	49.4 1.8	25.63 .15	35.7 1.3
20.3	57.20 .17	63.2 0.5	8.10 .16	39.9 0.5	50.52 .45	51.0 1.4	25.47 .17	36.9 1.0
30.3	57.02 .18	63.6 0.3	7.93 .18	40.3 0.4	50.05 .49	52.2 0.9	25.29 .18	37.7 0.6
Apr. 9.3	56.84 .18	63.9 0.3	7.75 .18	40.6 0.3	49.55 .51	52.9 +0.4	25.11 .19	38.1 -0.3
19.2	56.66 .17	64.1 +0.1	7.57 .17	40.8 +0.1	49.04 .50	53.0 0.0	24.92 .18	38.2 +0.1
29.2	56.50 .15	64.1 0.0	7.41 .15	40.9 0.0	48.56 .47	52.8 -0.5	24.75 .17	38.0 0.4
May 9.2	56.36 .12	64.0 -0.2	7.28 .12	40.9 -0.1	48.11 .42	52.0 1.0	24.59 .15	37.3 0.8
19.2	56.25 .09	63.8 0.3	7.17 .09	40.7 0.2	47.71 .36	50.8 1.4	24.45 .13	36.4 1.1
June 20.1	56.18 .05	63.5 0.4	7.09 .06	40.5 0.3	47.39 .28	49.1 1.8	24.34 .10	35.1 1.4
8.1	56.14 -.02	63.1 0.4	7.05 -.02	40.2 0.4	47.15 .20	47.2 2.1	24.26 .06	33.6 1.6
18.1	56.14 +.02	62.6 0.5	7.05 +.02	39.8 0.4	47.00 .10	44.9 2.4	24.21 -.03	31.9 1.8
28.0	56.19 .06	62.1 0.6	7.09 .06	39.3 0.5	46.95 -.01	42.4 2.6	24.19 .00	30.0 2.0
July 8.0	56.27 .10	61.5 0.6	7.16 .09	38.8 0.5	46.99 +.09	39.8 2.7	24.21 +.04	29.0 2.1
18.0	56.39 .14	60.8 0.6	7.27 .13	38.2 0.6	47.13 .18	37.0 2.8	24.27 .07	25.8 2.1
28.0	56.55 .17	60.2 0.7	7.42 .16	37.6 0.6	47.35 .27	34.2 2.8	24.36 .11	23.7 2.1
Aug. 6.9	56.73 .20	59.5 0.7	7.59 .19	36.9 0.7	47.67 .38	31.4 2.8	24.48 .14	21.7 2.0
16.9	56.95 .23	58.7 0.8	7.80 .22	36.2 0.7	48.07 .44	29.7 2.7	24.64 .17	19.8 1.8
26.9	57.19 .25	57.9 0.8	8.04 .25	35.4 0.8	48.54 .51	26.1 2.5	24.82 .20	18.2 1.5
Sept. 5.9	57.46 .28	57.1 0.8	8.29 .27	34.6 0.9	49.08 .58	23.6 2.3	25.04 .23	16.9 1.1
15.8	57.75 .30	56.2 0.9	8.58 .29	33.7 0.9	49.69 .63	21.4 2.1	25.28 .25	15.9 0.7
25.8	58.05 .32	55.3 0.9	8.88 .31	32.7 1.0	50.35 .68	19.5 1.8	25.55 .28	15.4 +0.3
Oct. 5.8	58.38 .33	54.4 1.0	9.20 .33	31.7 1.0	51.05 .72	17.8 1.5	25.83 .30	15.3 -0.2
15.7	58.72 .34	53.4 1.0	9.53 .34	30.7 1.0	51.79 .75	16.5 1.1	26.14 .31	15.7 0.7
25.7	59.06 .35	52.4 0.9	9.87 .35	29.7 1.0	52.56 .77	15.6 0.7	26.46 .32	16.7 1.2
Nov. 4.7	59.41 .35	51.5 0.9	10.22 .35	28.7 1.0	53.33 .77	15.0 -0.3	26.79 .32	18.1 1.6
14.7	59.76 .34	50.7 0.8	10.57 .34	27.7 0.9	54.09 .76	14.9 +0.1	27.10 .32	19.9 2.0
24.6	60.09 .33	50.0 0.7	10.91 .33	26.9 0.8	54.83 .72	15.3 0.6	27.41 .30	22.1 2.4
Dec. 4.6	60.41 .30	49.3 0.5	11.23 .31	26.2 0.6	55.53 .67	16.1 1.0	27.70 .28	24.7 2.7
14.6	60.70 .27	48.9 0.3	11.52 .28	25.6 0.5	56.16 .59	17.4 1.4	27.97 .25	27.5 2.9
24.6	60.95 .23	48.6 -0.2	11.78 .24	25.2 0.3	56.71 .50	19.0 1.8	28.19 .21	30.4 3.0
34.5	61.15 +.18	48.6 +0.1	11.99 +.19	25.1 -0.1	57.15 +.39	21.0 +2.1	28.38 +.16	33.3 -2.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\epsilon$ Hydræ.		$\zeta$ Ursæ Majoris.		$\gamma^2$ Ursæ Majoris.		$\kappa$ Cancri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 8 <sup>m</sup> 40	<sup>°</sup> +6 <sup>'</sup> 51	<sup>h</sup> 8 <sup>m</sup> 50	<sup>°</sup> +48 <sup>'</sup> 30	<sup>h</sup> 8 <sup>m</sup> 59	<sup>°</sup> +67 <sup>'</sup> 36	<sup>h</sup> 9 <sup>m</sup> 1	<sup>°</sup> +11 <sup>'</sup> 8
(Dec. 30.6)	24.22 +.33	40.5 -1.6	58.12 +.34	45.1 +0.7	48.50 +.53	72.2 +1.4	13.61 +.25	71.6 -1.4
Jan. 9.5	24.43 .19	39.0 1.4	58.43 .28	46.0 1.0	48.98 .44	73.8 1.9	13.85 .21	70.3 1.2
19.5	24.59 .14	37.7 1.2	58.67 .21	47.1 1.3	49.37 .33	75.9 2.2	14.04 .16	69.1 1.0
29.5	24.71 .09	36.6 1.0	58.84 .13	48.5 1.5	49.64 .21	78.1 2.4	14.18 .11	68.3 0.8
Feb. 8.5	24.78 +.04	35.7 0.8	58.94 +.06	50.1 1.7	49.78 +.08	80.6 2.5	14.26 .06	67.6 0.5
18.4	24.79 -.01	35.0 0.6	58.97 -.01	51.8 1.7	49.80 -.04	83.2 2.5	14.30 +.01	67.2 0.3
28.4	24.76 .05	34.6 0.4	58.92 .08	53.5 1.7	49.70 .15	85.7 2.5	14.29 -.03	66.9 -0.1
Mar. 10.4	24.69 .09	34.3 -0.2	58.82 .13	55.2 1.6	49.50 .25	88.0 2.3	14.23 .07	66.9 0.0
20.4	24.58 .12	34.2 0.0	58.66 .18	56.8 1.5	49.21 .34	90.2 2.0	14.14 .10	67.0 +0.1
30.3	24.45 .14	34.2 +0.1	58.46 .21	58 1 1.2	48.83 .40	91.9 1.6	14.03 .12	67.2 0.2
Apr. 9.3	24.31 .15	34.3 0.2	58.23 .23	59.2 0.9	48.41 .44	93.3 1.2	13.90 .14	67.4 0.3
19.3	24.17 .15	34.6 0.3	57.99 .24	60.0 0.6	47.95 .46	94.2 0.7	13.76 .14	67.8 0.4
29.3	24.02 .14	34.9 0.3	57.75 .24	60.4 +0.3	47.49 .46	94.7 +0.2	13.61 .14	68.2 0.4
May 9.2	23.89 .12	35.3 0.4	57.52 .22	60.5 -0.1	47.03 .44	94.6 -0.3	13.48 .13	68.6 0.4
19.2	23.77 .11	35.7 0.4	57.32 .19	60.3 0.4	46.60 .41	94.1 0.8	13.36 .11	69.0 0.4
29.2	23.68 .08	36.2 0.5	57.14 .16	59.7 0.7	46.22 .35	93.1 1.2	13.26 .09	69.3 0.4
June 8.1	23.61 .05	36.7 0.5	57.00 .12	58.8 1.0	45.90 .29	91.7 1.6	13.18 .07	69.7 0.4
18.1	23.57 -.03	37.2 0.5	56.90 .08	57.6 1.3	45.64 .22	89.9 2.0	13.13 .04	70.1 0.3
28.1	23.56 .00	37.7 0.5	56.84 -.03	56.2 1.5	45.46 .14	87.7 2.3	13.10 -.01	70.4 0.3
July 8.1	23.57 +.03	38.2 0.5	56.83 +.01	54.6 1.7	45.36 -.06	85.3 2.6	13.10 +.01	70.7 0.2
18.0	23.62 .06	38.7 0.4	56.87 .06	52.7 1.9	45.34 +.02	82.6 2.8	13.13 .04	70.9 0.2
28.0	23.70 .09	39.1 0.4	56.95 .10	50.8 2.0	45.40 .10	79.8 2.9	13.19 .07	71.0 +0.1
Aug. 7.0	23.80 .12	39.4 0.3	57.08 .15	48.7 2.1	45.55 .19	76.8 3.0	13.28 .10	71.1 0.0
17.0	23.93 .15	39.7 +0.1	57.25 .19	46.5 2.2	45.78 .27	73.8 3.0	13.39 .13	71.0 -0.1
26.9	24.09 .17	39.7 0.0	57.46 .23	44.3 2.2	46.08 .34	70.8 3.0	13.53 .16	70.8 0.3
Sept. 5.9	24.28 .20	39.6 -0.2	57.71 .27	42.1 2.2	46.46 .42	67.8 2.9	13.70 .18	70.4 0.5
15.9	24.49 .22	39.3 0.4	58.01 .31	39.9 2.2	46.91 .42	65.0 2.7	13.90 .21	69.8 0.7
25.8	24.72 .25	38.8 0.7	58.34 .35	37.8 2.1	47.43 .55	62.4 2.5	14.13 .24	69.0 0.9
Oct. 5.8	24.99 .27	38.0 0.9	58.70 .38	35.8 2.0	48.01 .61	59.9 2.3	14.38 .26	68.0 1.1
15.8	25.27 .29	37.0 1.1	59.09 .41	33.9 1.8	48.64 .65	57.8 2.0	14.66 .29	66.8 1.3
25.8	25.57 .31	35.7 1.3	59.51 .43	32.2 1.6	49.32 .69	56.0 1.6	14.95 .31	65.5 1.4
Nov. 4.7	25.88 .32	34.3 1.5	59.95 .45	30.7 1.3	50.02 .72	54.6 1.2	15.27 .32	63.9 1.6
14.7	26.20 .32	32.7 1.7	60.41 .45	29.6 1.0	50.75 .72	53.6 0.8	15.59 .32	62.3 1.7
24.7	26.52 .32	31.0 1.7	60.86 .45	28.7 0.7	51.48 .72	53.0 -0.2	15.92 .33	60.6 1.7
Dec. 4.7	26.84 .31	29.2 1.8	61.30 .43	28.2 -0.3	52.19 .69	53.0 +0.2	16.25 .32	58.8 1.7
14.6	27.13 .28	27.5 1.7	61.72 .41	28.0 0.0	52.86 .65	53.4 0.7	16.56 .30	57.2 1.6
24.6	27.40 .25	25.8 1.6	62.11 .37	28.2 +0.4	53.48 .58	54.4 1.2	16.85 .27	55.6 1.5
34.6	27.64 +.22	24.2 -1.5	62.45 +.31	28.8 +0.8	54.02 +.49	55.8 +1.6	17.10 +.22	54.2 -1.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Argus.		γ Draconis (H.)		α Hydre.		γ Ursæ Majoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 9 <sup>m</sup> 13	<sup>°</sup> 58 <sup>'</sup> 45	<sup>h</sup> 9 <sup>m</sup> 19	<sup>°</sup> +81 <sup>'</sup> 50	<sup>h</sup> 9 <sup>m</sup> 21	<sup>°</sup> -8 <sup>'</sup> 8	<sup>h</sup> 9 <sup>m</sup> 23	<sup>°</sup> +70 <sup>'</sup> 21
(Dec. 30.6)	<sup>s</sup> 53.04 +.33	52.0 -3.5	<sup>s</sup> 53.88+1.34	77.9 +1.7	<sup>s</sup> 40.33 +.98	5.8 -2.4	<sup>s</sup> 50.46 +.63	22.8 +1.3
Jan. 9.6	53.33 .25	55.7 3.8	55.11 1.11	79.9 2.2	40.57 .29	8.1 2.3	51.05 .53	24.4 1.8
19.6	53.54 .17	59.5 3.9	56.09 0.84	82.3 2.6	40.76 .17	10.4 2.1	51.53 .48	26.3 2.1
29.5	53.67 +.09	63.4 3.9	56.78 .53	85.0 2.8	40.91 .12	12.4 2.0	51.88 .39	28.6 2.4
Feb. 8.5	53.71 .00	67.2 3.8	57.15 +.29	87.9 3.0	41.01 .07	14.3 1.7	52.10 .15	31.2 2.6
18.5	53.67 -.08	70.9 3.6	57.22 -.09	90.9 3.0	41.06 +.02	15.9 1.5	52.18 +.01	33.8 2.7
28.4	53.56 .15	74.4 3.3	56.97 .39	93.8 2.9	41.06 -.02	17.3 1.3	52.12 -.12	36.5 2.6
Mar. 10.4	53.38 .21	77.6 3.0	56.44 .67	96.6 2.6	41.02 .06	18.4 1.0	51.94 .24	39.1 2.5
20.4	53.14 .28	80.4 2.6	55.64 .91	99.1 2.3	40.94 .09	19.3 0.7	51.65 .34	41.4 2.2
30.4	52.86 .30	82.8 2.2	54.63 1.11	101.2 1.9	40.83 .11	19.9 0.5	51.27 .42	43.4 1.9
Apr. 9.3	52.54 .33	84.7 1.7	53.44 1.25	102.8 1.4	40.71 .13	20.3 -0.3	50.81 .48	45.1 1.5
19.3	52.20 .35	86.2 1.2	52.14 1.34	103.9 0.9	40.58 .14	20.4 0.0	50.30 .52	46.3 1.0
29.3	51.84 .36	87.1 0.7	50.77 1.38	104.5 +0.3	40.44 .14	20.4 +0.2	49.77 .53	47.1 +0.5
May 9.3	51.49 .35	87.5 -0.2	49.40 1.36	104.5 -0.3	40.30 .13	20.1 0.4	49.24 .52	47.3 0.0
19.2	51.14 .34	87.5 +0.3	48.06 1.30	104.0 0.8	40.18 .12	19.6 0.5	48.73 .49	47.0 -0.5
29.2	50.81 .32	86.9 0.8	46.82 1.19	102.9 1.4	40.07 .10	19.0 0.7	48.26 .45	46.2 1.0
June 8.2	50.51 .29	85.8 1.3	45.69 1.06	101.3 1.8	39.97 .08	18.2 0.8	47.84 .39	45.0 1.5
18.1	50.24 .25	84.3 1.7	44.73 0.87	99.2 2.3	39.90 .08	17.3 1.0	47.49 .32	43.3 1.9
28.1	50.02 .20	82.3 2.1	43.96 .68	96.7 2.7	39.86 .03	16.3 1.1	47.21 .23	41.2 2.3
July 8.1	49.84 .15	80.0 2.4	43.30 .46	93.9 3.0	39.83 -.01	15.2 1.1	47.02 .15	38.8 2.6
18.1	49.71 .10	77.4 2.7	43.04 .24	90.8 3.2	39.84 +.02	14.0 1.1	46.92 -.06	36.1 2.8
28.0	49.65 -.04	74.6 2.9	42.91 -.01	87.5 3.4	39.87 .04	12.9 1.1	46.91 +.03	33.1 3.0
Aug. 7.0	49.64 +.03	71.7 2.9	43.02 +.22	84.1 3.5	39.92 .07	11.8 1.0	46.99 .13	30.1 3.1
17.0	49.70 .09	68.8 2.9	43.36 .45	80.6 3.5	40.01 .10	10.8 0.9	47.16 .22	26.9 3.2
27.0	49.83 .16	65.9 2.8	43.92 .67	77.1 3.4	40.12 .13	10.0 0.7	47.42 .31	23.7 3.2
Sept. 5.9	50.03 .23	63.3 2.5	44.69 .88	73.7 3.3	40.26 .16	9.4 0.5	47.77 .39	20.6 3.1
15.9	50.29 .29	60.9 2.2	45.68 1.06	70.5 3.2	40.43 .19	9.0 +0.2	48.21 .48	17.5 3.0
25.9	50.61 .35	58.9 1.7	46.85 1.26	67.4 2.9	40.64 .22	8.9 -0.1	48.73 .56	14.5 2.8
Oct. 5.8	50.99 .41	57.5 1.2	48.20 1.43	64.7 2.6	40.87 .25	9.1 0.4	49.32 .63	11.8 2.6
15.8	51.42 .45	56.5 +0.6	49.69 1.56	62.2 2.2	41.13 .27	9.7 0.8	50.00 .69	9.3 2.3
25.8	51.89 .48	56.3 0.0	51.32 1.68	60.2 1.8	41.42 .29	10.7 1.1	50.70 .74	7.2 1.9
Nov. 4.8	52.39 .50	56.6 -0.7	53.03 1.75	58.7 1.3	41.72 .31	12.0 1.5	51.46 .78	5.5 1.5
14.7	52.90 .51	57.6 1.3	54.81 1.79	57.6 0.8	42.04 .32	13.7 1.8	52.26 .80	4.2 1.1
24.7	53.40 .50	59.2 1.9	56.60 1.78	57.1 -0.2	42.36 .32	15.6 2.0	53.06 .81	3.3 -0.6
Dec. 4.7	53.89 .47	61.5 2.5	58.35 1.72	57.2 +0.3	42.68 .32	17.7 2.2	53.86 .79	3.0 0.6
14.7	54.34 .42	64.2 3.0	60.03 1.62	57.8 0.9	43.00 .30	19.9 2.3	54.63 .75	3.3 +0.5
24.6	54.73 .37	67.4 3.4	61.57 1.46	59.0 1.4	43.28 .27	22.3 2.4	55.35 .68	4.0 1.0
34.6	55.07 +.29	70.9 -3.6	62.92+1.24	60.7 +2.0	43.54 +.24	24.7 -2.3	55.99 +.59	5.3 +1.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\theta$ Ursæ Majoris.		$\epsilon$ Leonis.		$\mu$ Leonis.		$\alpha$ Leonis. (Regulus.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 9 <sup>m</sup> 24	<sup>°</sup> +52 <sup>'</sup> 13	<sup>h</sup> 9 <sup>m</sup> 39	<sup>°</sup> +24 <sup>'</sup> 19	<sup>h</sup> 9 <sup>m</sup> 45	<sup>°</sup> +26 <sup>'</sup> 34	<sup>h</sup> 10 <sup>m</sup> 1	<sup>°</sup> +12 <sup>'</sup> 33
(Dec. 30.6)	<sup>s</sup> 48.43 +.39	<sup>"</sup> 26.5 +0.5	<sup>s</sup> 1.02 +.30	<sup>"</sup> 41.6 -1.0	<sup>s</sup> 54.88 +.31	<sup>"</sup> 24.1 -0.9	<sup>s</sup> 57.50 +.39	<sup>"</sup> 22.3 -1.6
Jan. 9.6	48.79 .33	27.2 0.9	1.30 .96	40.7 0.6	55.17 .97	23.4 0.6	57.78 .96	20.8 1.4
19.6	49.09 .97	28.4 1.3	1.54 .91	40.3 0.3	55.42 .93	23.0 -0.2	58.02 .93	19.6 1.1
29.5	49.32 .19	29.8 1.6	1.73 .16	40.1 -0.1	55.62 .17	22.9 +0.1	58.22 .17	18.6 0.8
Feb. 8.5	49.47 .11	31.5 1.8	1.87 .11	40.1 +0.2	55.76 .12	23.1 0.3	58.37 .12	17.9 0.6
18.5	49.54 +.03	33.4 1.9	1.95 +.05	40.4 0.4	55.85 .06	23.5 0.6	58.47 .07	17.5 0.3
28.4	49.54 -.04	35.4 2.0	1.98 .00	41.0 0.6	55.88 +.01	24.2 0.7	58.52 +.03	17.3 -0.1
Mar. 10.4	49.47 .11	37.3 1.9	1.95 -.04	41.7 0.8	55.87 -.04	25.0 0.9	58.52 -.03	17.3 +0.1
20.4	49.33 .16	39.2 1.8	1.89 .06	42.5 0.8	55.81 .06	25.9 0.9	58.48 .06	17.5 0.3
30.4	49.14 .21	40.9 1.6	1.79 .11	43.3 0.8	55.71 .11	26.9 0.9	58.41 .06	17.9 0.4
Apr. 9.3	48.91 .94	42.3 1.3	1.67 .13	44.1 0.8	55.59 .13	27.8 0.9	58.32 .11	18.3 0.5
19.3	48.66 .96	43.5 1.0	1.53 .14	44.9 0.7	55.45 .14	28.7 0.8	58.20 .12	18.9 0.5
29.3	48.40 .96	44.2 0.6	1.39 .15	45.6 0.6	55.30 .15	29.4 0.7	58.06 .13	19.4 0.5
May 9.3	48.15 .95	44.7 +0.3	1.24 .14	46.1 0.5	55.16 .15	30.0 0.5	57.95 .12	19.9 0.5
19.2	47.90 .93	44.7 -0.2	1.10 .13	46.6 0.4	55.01 .14	30.5 0.4	57.83 .12	20.5 0.5
29.2	47.68 .91	44.3 0.6	0.98 .11	46.9 +0.2	54.89 .12	30.8 +0.2	57.71 .11	20.9 0.5
June 8.2	47.49 .17	43.5 0.9	0.88 .09	47.0 0.0	54.77 .10	30.9 0.0	57.61 .09	21.4 0.4
18.1	47.34 .13	42.4 1.3	0.79 .07	47.0 -0.1	54.69 .06	30.8 -0.2	57.53 .07	21.8 0.3
28.1	47.23 .09	41.0 1.6	0.74 .04	46.8 0.3	54.62 .05	30.5 0.3	57.47 .05	22.0 0.2
July 8.1	47.16 -.04	39.3 1.8	0.71 -.02	46.4 0.4	54.58 -.02	30.1 0.5	57.42 .03	22.2 +0.1
18.1	47.14 .00	37.4 2.0	0.70 +0.1	45.9 0.6	54.57 .00	29.5 0.7	57.40 -.01	22.3 0.0
28.0	47.17 +.05	35.3 2.2	0.73 .04	45.3 0.7	54.59 +.03	28.8 0.8	57.40 +.01	22.3 -0.1
Aug. 7.0	47.24 .10	32.9 2.4	0.78 .07	44.5 0.9	54.63 .06	27.8 1.0	57.43 .04	22.2 0.2
17.0	47.36 .14	30.5 2.5	0.86 .10	43.6 1.0	54.71 .09	26.8 1.2	57.49 .07	21.9 0.3
27.0	47.53 .19	29.0 2.5	0.98 .13	42.5 1.2	54.82 .12	25.5 1.3	57.57 .10	21.5 0.5
Sept. 5.9	47.75 .94	25.4 2.6	1.12 .16	41.2 1.3	54.95 .15	24.2 1.5	57.68 .13	20.9 0.7
15.9	48.01 .98	22.8 2.6	1.30 .19	39.9 1.4	55.13 .19	22.6 1.6	57.82 .16	20.1 0.9
25.9	48.31 .33	20.3 2.5	1.50 .22	38.3 1.6	55.33 .22	21.0 1.7	58.00 .19	19.0 1.1
Oct. 5.8	48.66 .37	17.9 2.4	1.74 .25	36.7 1.7	55.57 .25	19.2 1.8	58.20 .22	17.8 1.3
15.8	49.04 .40	15.5 2.2	2.01 .28	34.9 1.8	55.83 .28	17.3 1.9	58.44 .25	16.4 1.5
25.8	49.46 .44	13.4 2.0	2.31 .31	33.1 1.8	56.13 .31	15.4 1.9	58.71 .28	14.8 1.7
Nov. 4.8	49.91 .46	11.6 1.7	2.63 .33	31.3 1.8	56.45 .33	13.5 1.9	59.00 .31	13.0 1.8
14.7	50.39 .48	10.0 1.4	2.97 .35	29.5 1.8	56.80 .35	11.6 1.8	59.32 .32	11.2 1.9
24.7	50.87 .48	8.8 1.0	3.32 .35	27.7 1.7	57.15 .36	9.8 1.7	59.65 .34	9.2 1.9
Dec. 4.7	51.35 .48	7.9 0.6	3.68 .35	26.0 1.5	57.52 .36	8.2 1.5	59.90 .34	7.3 1.9
14.7	51.81 .45	7.5 -0.2	4.03 .34	24.6 1.3	57.87 .35	6.7 1.3	60.32 .33	5.4 1.8
24.6	52.25 .42	7.6 +0.2	4.36 .32	23.4 1.1	58.21 .32	5.6 1.0	60.64 .31	3.6 1.7
34.6	52.64 +.36	8.0 +0.7	4.66 +.28	22.4 -0.8	58.52 +.29	4.6 -0.7	60.94 +.26	2.0 -1.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*32 Ursæ Majoris		γ <sup>1</sup> Leonis.		*9 Draconis (H.)		ρ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 10	<sup>m</sup> 9	<sup>h</sup> 10	<sup>m</sup> 13	<sup>h</sup> 10	<sup>m</sup> 24	<sup>h</sup> 10	<sup>m</sup> 26
(Dec. 30.6)	17.62 +.59	20.6 +0.6	19.86 +.32	62.0 -1.3	52.04 +.98	46.3 +0.8	28.11 +.30	36.2 -1.8
Jan. 9.6	18.18 .53	21.4 1.1	20.16 .28	60.8 1.0	52.97 .88	47.4 1.4	28.40 .28	34.5 1.6
19.6	18.66 .44	22.8 1.6	20.42 .24	59.9 0.7	53.78 .74	49.0 1.8	28.66 .24	33.0 1.3
29.6	19.06 .34	24.6 2.0	20.64 .19	59.3 0.4	54.45 .58	51.0 2.3	28.87 .19	31.8 1.1
Feb. 8.5	19.35 .23	26.8 2.3	20.81 .14	59.1 -0.1	54.95 .41	53.5 2.6	29.05 .15	30.9 0.8
18.5	19.52 .12	29.2 2.5	20.92 .09	59.1 +0.2	55.26 .22	56.2 2.8	29.17 .10	30.3 0.5
28.5	19.59 +.01	31.8 2.6	20.99 +.04	59.4 0.4	55.39 +.04	59.1 2.9	29.24 .05	29.9 -0.3
Mar. 10.5	19.55 -.09	34.4 2.6	21.00 -.01	59.9 0.6	55.34 -.15	62.0 2.9	29.27 +.01	29.8 0.0
20.4	19.41 .19	36.9 2.4	20.97 .05	60.5 0.7	55.10 .31	64.8 2.7	29.26 -.03	29.8 +0.2
30.4	19.18 .27	39.3 2.9	20.91 .08	61.3 0.8	54.71 .46	67.4 2.5	29.21 .06	30.1 0.3
Apr. 9.4	18.88 .33	41.3 1.9	20.82 .10	62.1 0.8	54.19 .58	69.7 2.1	29.13 .09	30.4 0.4
19.3	18.53 .37	43.0 1.5	20.70 .12	62.9 0.8	53.55 .68	71.6 1.7	29.03 .10	30.9 0.5
29.3	18.14 .40	44.3 1.1	20.58 .13	63.7 0.7	52.84 .74	73.1 1.2	28.93 .11	31.4 0.5
May 9.3	17.73 .41	45.2 0.6	20.45 .13	64.3 0.6	52.07 .78	74.0 0.7	28.81 .12	32.0 0.5
19.3	17.32 .41	45.5 +0.1	20.32 .12	64.9 0.5	51.29 .78	74.4 +0.1	28.69 .11	32.5 0.5
29.2	16.92 .38	45.4 -0.4	20.20 .12	65.4 0.4	50.52 .76	74.3 -0.4	28.58 .11	33.1 0.5
June 8.2	16.55 .35	44.7 0.9	20.09 .10	65.7 0.3	49.77 .72	73.6 1.0	28.48 .10	33.6 0.5
18.2	16.22 .31	43.6 1.3	20.00 .08	65.9 +0.1	49.09 .65	72.3 1.5	28.39 .08	34.1 0.4
28.2	15.93 .26	42.1 1.7	19.92 .06	66.0 0.0	48.48 .57	70.6 1.9	28.31 .07	34.5 0.4
July 8.1	15.71 .20	40.2 2.1	19.87 .04	65.9 -0.2	47.96 .47	68.5 2.3	28.26 .05	34.8 0.3
18.1	15.54 .13	37.9 2.4	19.84 -.02	65.6 0.3	47.54 .36	66.0 2.7	28.22 .03	35.1 0.2
28.1	15.44 -.07	35.3 2.7	19.83 .00	65.2 0.5	47.23 .24	63.1 3.0	28.20 -.01	35.1 +0.1
Aug 7.0	15.41 .00	32.5 2.9	19.85 +.03	64.7 0.7	47.05 -.12	60.0 3.2	28.20 +.02	35.1 -0.1
17.0	15.44 +.07	29.4 3.1	19.89 .06	63.9 0.8	46.99 .00	56.6 3.4	28.23 .04	35.0 0.2
27.0	15.55 .14	26.3 3.2	19.97 .09	63.0 1.0	47.06 +.13	53.1 3.5	28.29 .07	34.7 0.4
Sept. 6.0	15.73 .22	23.0 3.3	20.07 .12	61.9 1.2	47.26 .28	49.5 3.6	28.38 .10	34.2 0.6
15.9	15.99 .29	19.8 3.3	20.21 .15	60.6 1.4	47.59 .39	46.0 3.5	28.49 .13	33.5 0.8
25.9	16.31 .36	16.5 3.2	20.38 .19	59.2 1.5	48.04 .52	42.5 3.4	28.64 .17	32.6 1.0
Oct. 5.9	16.71 .43	13.4 3.0	20.58 .22	57.5 1.7	48.63 .65	39.1 3.3	28.83 .20	31.5 1.2
15.9	17.18 .50	10.5 2.8	20.82 .25	55.8 1.8	49.33 .76	35.9 3.0	29.05 .23	30.1 1.5
25.8	17.70 .55	7.6 2.5	21.09 .28	53.9 1.9	50.15 .86	33.0 2.7	29.30 .27	28.6 1.7
Nov. 4.8	18.20 .60	5.4 2.2	21.39 .31	51.9 2.0	51.06 .95	30.5 2.3	29.58 .29	26.8 1.8
14.8	18.91 .64	3.4 1.8	21.71 .32	49.9 2.0	52.04 1.02	28.4 1.9	29.88 .32	24.9 2.0
24.7	19.57 .66	1.9 1.3	22.05 .35	47.9 2.0	53.09 1.07	26.8 1.3	30.21 .35	22.9 2.0
Dec. 4.7	20.23 .67	0.8 0.8	22.40 .35	46.0 1.9	54.17 1.08	25.8 0.8	30.54 .34	20.9 2.0
14.7	20.90 .65	0.3 -0.3	22.75 .34	44.2 1.7	55.24 1.07	25.3 -0.2	30.88 .33	18.8 2.0
24.7	21.54 .62	0.3 +0.3	23.09 .33	42.6 1.5	56.29 1.02	25.5 +0.4	31.21 .38	16.9 1.9
34.6	22.13 +.57	0.8 +0.8	23.40 +.30	41.3 -1.2	57.27 +.94	26.2 +1.0	31.52 +.30	15.1 -1.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Argus.		$\iota$ Leonis.		$\alpha$ Ursæ Majoris.		$\delta$ Leonis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 10 40	<sup>°</sup> -59 2	<sup>h</sup> 10 42	<sup>°</sup> +11 10	<sup>h</sup> 10 56	<sup>°</sup> +62 23	<sup>h</sup> 11 7	<sup>°</sup> +21 10
(Dec. 30.7)	<sup>s</sup> 23.58 +.46	<sup>"</sup> 40.6 -2.9	<sup>s</sup> 55.38 +.39	<sup>"</sup> 58.7 -1.8	<sup>s</sup> 17.75 +.58	<sup>"</sup> 52.0 -0.1	<sup>s</sup> 41.94 +.34	<sup>"</sup> 59.3 -1.6
Jan. 9.6	24.01 .40	43.7 3.3	55.68 .39	57.0 1.6	18.31 .53	52.2 +0.5	42.27 .39	57.9 1.3
	19.6 24.38 .34	47.1 3.5	55.96 .26	55.5 1.3	18.80 .47	53.0 1.0	42.57 .28	56.8 0.9
	29.6 24.69 .37	50.8 3.7	56.19 .31	54.4 1.0	19.23 .39	54.2 1.5	42.83 .34	56.0 0.6
Feb. 8.6	24.91 .19	54.5 3.8	56.37 .16	53.5 0.7	19.58 .30	56.0 1.9	43.05 .30	55.6 -0.2
	18.5 25.06 .11	58.3 3.8	56.51 .11	52.9 0.5	19.84 .21	58.1 2.3	43.22 .15	55.5 +0.1
	28.5 25.13 +.03	62.1 3.7	56.60 .07	52.5 -0.2	20.00 .11	60.5 2.5	43.34 .10	55.8 0.4
Mar. 10.5	25.13 -.04	65.7 3.5	56.65 +.02	52.5 0.0	20.06 +.01	63.0 2.6	43.41 +.05	56.3 0.6
	20.5 25.06 .10	69.0 3.9	56.65 -.02	52.6 +0.2	20.03 -.07	65.6 2.6	43.44 .00	57.1 0.8
	30.4 24.93 .16	72.1 2.9	56.62 .06	52.9 0.4	19.92 .15	68.2 2.5	43.43 -.03	58.0 0.9
Apr. 9.4	24.74 .21	74.9 2.6	56.55 .08	53.4 0.5	19.73 .22	70.6 2.3	43.38 .06	58.9 1.0
	19.4 24.52 .25	77.3 2.9	56.47 .09	54.0 0.6	19.48 .37	72.7 2.0	43.30 .08	60.0 1.0
	29.3 24.26 .27	79.2 1.7	56.36 .11	54.6 0.6	19.19 .31	74.5 1.6	43.21 .10	61.0 1.0
May 9.3	23.97 .29	80.7 1.2	56.26 .11	55.2 0.6	18.86 .34	75.9 1.2	43.10 .11	62.0 0.9
	19.3 23.67 .31	81.7 0.7	56.14 .11	55.8 0.6	18.52 .35	76.8 0.7	42.98 .12	62.9 0.8
	29.3 23.36 .31	82.2 -0.3	56.03 .11	56.4 0.6	18.17 .35	77.3 +0.2	42.87 .12	63.6 0.7
June 8.2	23.06 .30	82.2 +0.3	55.93 .10	56.9 0.5	17.83 .33	77.3 -0.2	42.75 .11	64.2 0.5
	18.2 22.76 .29	81.7 0.7	55.83 .09	57.4 0.4	17.50 .31	76.8 0.7	42.64 .10	64.6 0.3
	28.2 22.47 .27	80.7 1.2	55.75 .07	57.8 0.3	17.20 .28	75.9 1.2	42.54 .09	64.8 +0.1
July 8.2	22.22 .24	79.2 1.6	55.68 .06	58.1 0.2	16.94 .24	74.5 1.6	42.46 .08	64.9 -0.1
	18.1 21.99 .21	77.4 2.0	55.63 .04	58.3 +0.1	16.73 .20	72.6 2.0	42.38 .06	64.7 0.2
	28.1 21.80 .16	75.2 2.3	55.60 -.02	58.3 0.0	16.55 .15	70.4 2.3	42.33 .04	64.3 0.4
Aug. 7.1	21.67 .11	72.7 2.6	55.59 .00	58.3 -0.1	16.43 .09	67.9 2.6	42.30 -.02	63.8 0.7
	17.0 21.59 -.06	70.1 2.7	55.61 +.03	58.1 0.3	16.37 -.04	65.2 2.9	42.29 .00	63.0 0.9
	27.0 21.57 +.01	67.3 2.8	55.65 .06	57.7 0.5	16.36 +.02	62.1 3.1	42.30 +.03	62.0 1.1
Sept. 6.0	21.62 .08	64.5 2.7	55.72 .08	57.1 0.7	16.42 .09	58.9 3.3	42.35 .06	60.8 1.3
	16.0 21.74 .16	61.8 2.6	55.82 .12	56.3 0.9	16.54 .16	55.6 3.3	42.42 .09	59.4 1.5
	25.9 21.93 .23	59.4 2.3	55.95 .15	55.3 1.1	16.73 .22	52.2 3.4	42.53 .13	57.8 1.7
Oct. 5.9	22.20 .30	57.2 1.9	56.12 .19	54.1 1.3	16.99 .29	48.9 3.3	42.68 .17	56.0 1.9
	15.9 22.54 .37	55.5 1.5	56.33 .29	52.6 1.5	17.32 .36	45.6 3.9	42.87 .21	54.1 2.0
	25.9 22.94 .43	54.3 0.9	56.57 .26	51.0 1.7	17.71 .49	42.5 3.0	43.10 .24	52.0 2.2
Nov. 4.8	23.40 .48	53.6 +0.3	56.84 .29	49.2 1.9	18.17 .48	39.6 2.7	43.36 .26	49.7 2.3
	14.8 23.90 .51	53.6 -0.3	57.14 .31	47.2 2.0	18.68 .53	37.0 2.4	43.66 .31	47.5 2.3
	24.8 24.42 .53	54.2 0.9	57.46 .33	45.1 2.1	19.23 .57	34.8 2.0	43.98 .33	45.2 2.2
Dec. 4.7	24.96 .54	55.4 1.5	57.79 .34	43.0 2.1	19.81 .59	33.0 1.5	44.32 .35	43.0 2.1
	14.7 25.49 .52	57.2 2.1	58.13 .34	41.0 2.0	20.41 .60	31.7 1.0	44.67 .35	40.9 2.0
	24.7 26.00 .49	59.6 2.6	58.47 .33	39.0 1.9	21.01 .59	31.0 -0.4	45.03 .35	39.1 1.7
	34.7 26.46 +.44	62.4 -3.0	58.78 +.31	37.2 -1.7	21.58 +.55	30.9 +0.1	45.36 +.33	37.5 -1.4



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Crateris.		$\tau$ Leonis.		$\gamma$ Draconis.		$\nu$ Leonis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 11 <sup>m</sup> 13	<sup>°</sup> -14 <sup>'</sup> 7	<sup>h</sup> 11 <sup>m</sup> 21	<sup>°</sup> +3 <sup>'</sup> 30	<sup>h</sup> 11 <sup>m</sup> 24	<sup>°</sup> +69 <sup>'</sup> 59	<sup>h</sup> 11 <sup>m</sup> 30	<sup>°</sup> -0 <sup>'</sup> 9
(Dec. 30.7)	<sup>s</sup> 18.81 +.33	<sup>"</sup> 26.7 -2.4	<sup>s</sup> 44.23 +.33	<sup>"</sup> 74.0 -2.1	<sup>s</sup> 15.23 +.76	<sup>"</sup> 30.0 -0.2	<sup>s</sup> 46.50 +.33	<sup>"</sup> 26.5 -2.2
Jan. 9.7	19.13 .30	29.2 2.5	44.55 .31	72.0 2.0	15.96 .71	30.1 +0.4	46.82 .31	28.7 2.1
19.6	19.41 .27	31.6 2.4	44.84 .27	70.1 1.8	16.64 .64	30.8 1.0	47.12 .28	30.7 1.9
29.6	19.66 .23	34.0 2.3	45.10 .24	68.5 1.5	17.23 .55	32.1 1.6	47.38 .24	32.5 1.7
Feb. 8.6	19.87 .19	36.3 2.2	45.31 .19	67.1 1.2	17.74 .45	33.9 2.0	47.60 .20	34.1 1.5
18.5	20.03 .14	38.3 2.0	45.49 .15	66.0 1.0	18.12 .33	36.1 2.4	47.78 .16	35.4 1.2
28.5	20.15 .09	40.2 1.7	45.61 .10	65.1 0.7	18.39 .20	38.7 2.7	47.92 .11	36.5 0.9
Mar. 10.5	20.22 .05	41.8 1.5	45.69 .06	64.5 0.4	18.53 +.07	41.5 2.8	48.01 .07	37.3 0.7
20.5	20.25 +.01	43.2 1.2	45.74 +.02	64.3 -0.2	18.54 -0.05	44.3 2.8	48.06 +.03	37.8 0.4
30.4	20.25 -0.02	44.3 1.0	45.74 -0.01	64.2 0.0	18.43 .16	47.1 2.8	48.08 .00	38.1 -0.2
Apr. 9.4	20.21 .05	45.2 0.7	45.72 .04	64.3 +0.2	18.22 .26	49.8 2.6	48.06 -0.03	38.2 0.0
19.4	20.15 .07	45.8 0.5	45.67 .06	64.5 0.3	17.91 .25	52.3 2.3	48.01 .05	38.1 +0.2
29.4	20.07 .09	46.2 -0.5	45.59 .08	64.9 0.4	17.53 .41	54.4 1.9	47.95 .07	37.9 0.3
May 9.3	19.98 .10	46.3 0.0	45.51 .09	65.4 0.5	17.09 .46	56.1 1.5	47.87 .08	37.5 0.4
19.3	19.87 .10	46.3 +0.2	45.41 .10	65.9 0.6	16.60 .50	57.3 1.0	47.78 .09	37.1 0.5
29.3	19.77 .11	46.0 0.3	45.31 .10	66.5 0.6	16.10 .51	58.0 +0.5	47.69 .10	36.6 0.5
June 8.2	19.66 .10	45.6 0.5	45.21 .10	67.1 0.6	15.59 .51	58.2 -0.1	47.59 .10	36.0 0.6
18.2	19.56 .10	45.0 0.7	45.12 .09	67.7 0.6	15.09 .49	57.9 0.6	47.49 .09	35.4 0.6
28.2	19.46 .09	44.2 0.8	45.03 .09	68.3 0.6	14.62 .46	57.1 1.1	47.40 .09	34.8 0.6
July 8.2	19.37 .08	43.3 0.9	44.94 .08	68.8 0.5	14.19 .41	55.7 1.6	47.32 .08	34.2 0.6
18.1	19.30 .07	42.3 1.0	44.87 .08	69.3 0.4	13.80 .36	53.9 2.0	47.24 .07	33.6 0.6
28.1	19.24 .05	41.3 1.1	44.81 .05	69.7 0.4	13.46 .30	51.7 2.4	47.17 .06	33.0 0.5
Aug. 7.1	19.19 .03	40.2 1.1	44.77 .03	70.0 0.3	13.20 .23	49.1 2.8	47.13 .04	32.6 0.4
17.1	19.17 -0.01	39.1 1.0	44.75 -0.01	70.2 +0.1	13.00 .16	46.2 3.1	47.10 -0.02	32.2 0.3
27.0	19.18 +.02	38.1 0.9	44.75 +.01	70.3 -0.1	12.88 -0.08	43.0 3.3	47.09 +.01	32.0 +0.2
Sept. 6.0	19.21 .05	37.2 0.8	44.78 .04	70.1 0.3	12.85 +.01	39.6 3.5	47.11 .03	31.9 0.6
16.0	19.28 .08	36.5 0.6	44.84 .08	69.7 0.5	12.91 .10	36.0 3.6	47.16 .07	32.0 -0.2
25.9	19.38 .12	36.0 +0.3	44.94 .11	69.2 0.7	13.05 .19	32.4 3.6	47.25 .10	32.4 0.5
Oct. 5.9	19.52 .16	35.8 0.0	45.07 .15	68.4 0.9	13.20 .29	28.7 3.6	47.37 .14	33.0 0.7
15.9	19.70 .20	36.0 -0.3	45.24 .19	67.3 1.2	13.63 .38	25.2 3.5	47.53 .18	33.8 1.0
25.9	19.92 .24	36.4 0.6	45.44 .22	65.9 1.5	14.06 .48	21.8 3.3	47.73 .22	35.0 1.3
Nov. 4.8	20.18 .27	37.3 1.0	45.69 .26	64.3 1.7	14.58 .56	18.6 3.0	47.96 .26	36.4 1.5
14.8	20.47 .30	38.5 1.4	45.96 .29	62.5 1.9	15.18 .64	15.7 2.7	48.24 .29	38.1 1.8
24.8	20.79 .33	40.0 1.7	46.27 .32	60.6 2.0	15.85 .70	13.2 2.2	48.54 .31	40.0 2.0
Dec. 4.8	21.12 .34	41.9 2.0	46.59 .33	58.4 2.1	16.57 .74	11.2 1.7	48.86 .33	42.0 2.1
14.7	21.46 .34	43.9 2.2	46.93 .34	56.3 2.2	17.32 .76	9.8 1.2	49.19 .34	44.2 2.2
24.7	21.80 .33	46.2 2.4	47.26 .33	54.1 2.1	18.08 .76	8.9 -0.6	49.53 .33	46.4 2.2
34.7	22.13 +.32	48.6 -2.4	47.59 +.32	52.0 -2.0	18.83 +.73	8.7 0.0	49.86 +.32	48.6 -2.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Leonis.		$\gamma$ Ursæ Majoris.		$\epsilon$ Virginis.		$\epsilon^4$ Draconis (H.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 11 42	+15° 14'	<sup>h</sup> <sup>m</sup> 11 47	+54° 21'	<sup>h</sup> <sup>m</sup> 11 59	+9° 23'	<sup>h</sup> <sup>m</sup> 12 6	+78° 16'
(Dec. 30.7)	<sup>s</sup> 54.52 +.34	43.6 -1.9	<sup>s</sup> 29.43 +.49	40.5 -1.0	<sup>s</sup> 3.90 +.34	68.8 -2.1	<sup>s</sup> 34.90 +1.19	51.5 -0.6
Jan. 9.7	54.85 .32	41.9 1.6	29.92 .47	39.8 -0.4	4.23 .32	66.8 1.9	35.38 1.16	51.3 +0.1
19.6	55.16 .30	40.4 1.3	30.37 .44	39.7 +0.2	4.54 .30	65.1 1.6	36.51 1.09	51.7 0.7
29.6	55.44 .28	39.2 1.0	30.78 .39	40.2 0.7	4.83 .27	63.6 1.3	37.56 .98	52.8 1.4
Feb. 8.6	55.68 .29	38.3 0.7	31.14 .33	41.2 1.2	5.07 .23	62.5 1.0	38.47 .84	54.5 1.9
18.6	55.88 .17	37.8 -0.3	31.43 .25	42.7 1.7	5.28 .19	61.6 0.7	39.22 .67	56.6 2.3
28.5	56.03 .13	37.7 0.0	31.65 .18	44.6 2.0	5.45 .14	61.1 0.4	39.80 .47	59.1 2.7
Mar. 10.5	56.14 .08	37.8 +0.3	31.79 .11	46.8 2.3	5.57 .10	60.9 -0.1	40.17 .27	62.0 2.9
20.5	56.20 +.04	38.2 0.5	31.86 +.03	49.2 2.5	5.65 .06	60.9 +0.2	40.34 +.06	65.0 3.0
30.4	56.22 .00	38.8 0.7	31.86 -0.03	51.6 2.5	5.69 +.02	61.2 0.4	40.30 -1.14	68.0 3.0
Apr. 9.4	56.21 -.03	39.6 0.8	31.80 .09	54.1 2.4	5.69 -.01	61.7 0.6	40.07 .32	71.0 2.9
19.4	56.17 .05	40.5 0.9	31.68 .14	56.5 2.3	5.67 .04	62.3 0.7	39.66 .49	73.8 2.6
29.4	56.10 .07	41.4 0.9	31.52 .18	58.6 2.0	5.62 .06	63.0 0.7	39.09 .64	76.3 2.3
May 9.3	56.02 .09	42.3 0.9	31.32 .21	60.5 1.7	5.56 .07	63.8 0.8	38.39 .75	78.4 1.9
19.3	55.93 .10	43.2 0.9	31.09 .24	62.0 1.3	5.48 .09	64.6 0.8	37.59 .84	80.0 1.4
29.3	55.82 .10	44.1 0.8	30.85 .25	63.2 0.9	5.39 .09	65.4 0.7	36.71 .91	81.2 0.9
June 8.3	55.72 .11	44.8 0.7	30.59 .25	63.9 +0.5	5.29 .10	66.1 0.7	35.78 .94	81.8 +0.3
18.2	55.61 .10	45.4 0.5	30.34 .25	64.2 0.0	5.19 .10	66.8 0.8	34.84 .94	81.9 -0.2
28.2	55.51 .10	45.9 0.4	30.10 .24	64.0 -0.4	5.10 .10	67.3 0.5	33.90 .92	81.4 0.7
July 8.2	55.42 .09	46.2 0.2	29.87 .22	63.3 0.9	5.00 .09	67.8 0.4	33.00 .88	80.4 1.3
18.1	55.33 .08	46.3 +0.1	29.66 .20	62.3 1.3	4.91 .08	68.2 0.3	32.15 .81	78.8 1.8
28.1	55.25 .07	46.3 -0.1	29.47 .17	60.8 1.7	4.83 .08	68.4 +0.1	31.38 .73	76.8 2.3
Aug. 7.1	55.19 .05	46.1 0.3	29.31 .14	58.9 2.0	4.76 .06	68.4 0.0	30.69 .63	74.3 2.7
17.1	55.15 .03	45.7 0.5	29.19 .10	56.7 2.4	4.71 .04	68.3 -0.2	30.11 .52	71.5 3.0
27.0	55.13 -.01	45.1 0.7	29.11 .08	54.1 2.7	4.67 -.02	68.1 0.4	29.65 .39	68.3 3.3
Sept. 6.0	55.14 +.02	44.3 0.9	29.08 -.01	51.3 2.9	4.67 +.01	67.6 0.6	29.33 .25	64.8 3.6
16.0	55.17 .06	43.2 1.2	29.09 +.04	48.3 3.1	4.69 .04	66.9 0.8	29.15 -.11	61.2 3.7
26.0	55.24 .09	41.9 1.4	29.16 .10	45.1 3.2	4.74 .07	66.0 1.0	29.12 +.05	57.4 3.8
Oct. 5.9	55.35 .13	40.4 1.6	29.29 .16	41.8 3.3	4.83 .11	64.8 1.3	29.25 .21	53.5 3.8
15.9	55.50 .17	38.7 1.8	29.47 .22	38.4 3.4	4.97 .15	63.4 1.5	29.55 .38	49.7 3.8
25.9	55.69 .21	36.8 2.0	29.72 .28	35.1 3.3	5.14 .19	61.8 1.7	30.01 .54	46.0 3.6
Nov. 4.8	55.92 .25	34.7 2.2	30.02 .33	31.8 3.2	5.35 .23	59.9 1.9	30.63 .70	42.5 3.4
14.8	56.18 .28	32.5 2.3	30.30 .39	28.8 2.9	5.61 .27	57.9 2.1	31.41 .84	39.3 3.0
24.8	56.48 .31	30.2 2.3	30.80 .43	26.0 2.6	5.89 .30	55.7 2.2	32.32 .97	36.4 2.6
Dec. 4.8	56.80 .33	27.9 2.3	31.25 .47	23.5 2.2	6.21 .32	53.4 2.2	33.34 1.07	34.1 2.1
14.7	57.14 .34	25.7 2.2	31.73 .49	21.5 1.8	6.54 .33	51.3 2.2	34.46 1.14	32.2 1.5
24.7	57.48 .34	23.6 2.0	32.22 .49	20.0 1.3	6.87 .34	49.1 2.1	35.63 1.18	31.0 0.9
34.7	57.82 +.33	21.6 -1.8	32.71 +.48	19.0 -0.7	7.21 1.33	47.0 -2.0	36.81 +1.17	30.4 -0.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	* $\beta$ Chamæleonis.		$\eta$ Virginis.		$\alpha^1$ Cracis.		$\beta$ Corvi.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 12 <sup>m</sup> 11	<sup>°</sup> 78 <sup>'</sup> 36	<sup>h</sup> 12 <sup>m</sup> 13	<sup>°</sup> 0 <sup>'</sup> 0	<sup>h</sup> 12 <sup>m</sup> 19	<sup>°</sup> 62 <sup>'</sup> 25	<sup>h</sup> 12 <sup>m</sup> 28	<sup>°</sup> 22 <sup>'</sup> 43
(Dec. 30.7)	<sup>s</sup> 16.14+1.25	<sup>"</sup> 12.6 -1.5	<sup>s</sup> 43.96 +.34	<sup>"</sup> 14.2 -2.2	<sup>s</sup> 52.63 +.60	<sup>"</sup> 26.2 -1.7	<sup>s</sup> 2.80 +.36	<sup>"</sup> 36.5 -2.2
Jan. 9.7	17.36 1.18	14.4 2.0	44.29 .32	12.0 2.1	53.22 .57	28.2 2.2	3.15 .35	38.7 2.3
19.7	18.50 1.08	16.7 2.6	44.61 .30	10.0 1.9	53.78 .53	30.6 2.6	3.49 .33	41.1 2.4
29.7	19.52 .96	19.5 3.0	44.90 .27	8.1 1.7	54.28 .48	33.4 3.0	3.80 .30	43.5 2.4
Feb. 8.6	20.41 .81	22.7 3.3	45.15 .24	6.5 1.5	54.73 .41	36.6 3.3	4.08 .26	45.9 2.4
18.6	21.14 .65	26.2 3.6	45.37 .20	5.2 1.2	55.11 .34	39.9 3.4	4.32 .22	48.2 2.3
28.6	21.71 .49	29.9 3.8	45.55 .15	4.1 0.9	55.41 .27	43.5 3.5	4.52 .18	50.4 2.1
Mar. 10.5	22.11 .32	33.7 3.9	45.68 .11	3.3 0.7	55.64 .19	47.0 3.6	4.68 .14	52.5 1.9
20.5	22.34 +.15	37.6 3.9	45.78 .08	2.8 0.4	55.79 .19	50.6 3.5	4.79 .10	54.3 1.7
30.5	22.41 -.02	41.4 3.8	45.83 .04	2.5 -0.2	55.88 +.05	54.0 3.4	4.87 .06	56.0 1.5
Apr. 9.5	22.31 .17	45.1 3.6	45.86 +.01	2.5 0.0	55.89 -.02	57.3 3.2	4.91 +.02	57.4 1.3
19.4	22.06 .32	48.6 3.4	45.85 -.02	2.6 +0.2	55.84 .08	60.4 2.9	4.92 .00	58.5 1.1
29.4	21.66 .46	51.8 3.1	45.82 .04	2.9 0.3	55.73 .13	63.2 2.6	4.90 -.03	59.5 0.8
May 9.4	21.14 .58	54.7 2.7	45.77 .06	3.3 0.4	55.57 .18	65.6 2.3	4.86 .05	60.2 0.6
19.4	20.50 .69	57.2 2.3	45.71 .07	3.8 0.5	55.37 .23	67.7 1.9	4.80 .07	60.7 0.3
29.3	19.77 .78	59.3 1.8	45.63 .08	4.4 0.6	55.12 .26	69.3 1.4	4.73 .08	60.9 -0.1
June 8.3	18.95 .85	60.8 1.3	45.54 .09	5.0 0.6	54.84 .29	70.5 1.0	4.64 .10	60.9 +0.1
18.3	18.08 .89	61.9 0.8	45.45 .09	5.6 0.6	54.54 .31	71.3 -0.5	4.54 .10	60.7 0.3
28.3	17.17 .92	62.4 -0.2	45.36 .10	6.2 0.6	54.22 .32	71.5 0.0	4.43 .11	60.3 0.5
July 8.2	16.25 .91	62.3 +0.3	45.26 .09	6.8 0.6	53.89 .33	71.2 +0.5	4.32 .11	59.6 0.7
18.2	15.35 .88	61.7 0.9	45.17 .09	7.4 0.5	53.57 .32	70.5 1.0	4.21 .11	58.8 0.9
28.2	14.49 .82	60.6 1.4	45.08 .08	7.9 0.5	53.26 .30	69.3 1.4	4.10 .10	57.9 1.0
Aug 7.1	13.72 .73	58.9 1.9	45.01 .07	8.3 0.4	52.97 .27	67.6 1.8	4.00 .09	56.8 1.1
17.1	13.04 .61	56.8 2.3	44.94 .05	8.6 0.3	52.72 .22	65.6 2.2	3.91 .08	55.7 1.2
27.1	12.51 .46	54.4 2.6	44.90 .03	8.8 +0.1	52.53 .17	63.3 2.4	3.84 .05	54.4 1.2
Sept. 6.1	12.13 .29	51.6 2.8	44.88 -.01	8.9 0.0	52.39 .10	60.8 2.6	3.80 -.03	53.3 1.2
16.0	11.93 -.10	48.7 3.0	44.88 +.02	8.8 -0.2	52.32 -.02	58.1 2.7	3.79 +.01	52.1 1.1
26.0	11.93 +.10	45.7 3.0	44.93 .06	8.4 0.5	52.34 +.06	55.4 2.7	3.82 .05	51.2 0.9
Oct. 6.0	12.14 .31	42.7 2.9	45.01 .10	7.8 0.7	52.45 .15	52.8 2.5	3.89 .09	50.4 0.6
15.9	12.55 .52	39.9 2.7	45.12 .14	6.9 1.0	52.64 .24	50.4 2.3	4.00 .14	49.9 +0.4
25.9	13.17 .71	37.4 2.4	45.29 .18	5.8 1.2	52.93 .33	48.3 1.9	4.17 .19	49.7 0.0
Nov. 4.9	13.98 .89	35.2 1.9	45.49 .22	4.5 1.5	53.30 .41	46.5 1.5	4.38 .23	49.8 -0.3
14.9	14.95 1.04	33.5 1.4	45.73 .26	2.8 1.7	53.75 .46	45.3 1.0	4.63 .27	50.3 0.7
24.8	16.05 1.16	32.4 0.8	46.01 .29	+1.0 1.9	54.27 .54	44.6 +0.4	4.92 .31	51.1 1.1
Dec. 4.8	17.26 1.24	31.9 +0.2	46.32 .32	-1.0 2.1	54.83 .58	44.4 -0.2	5.25 .34	52.4 1.4
14.8	18.52 1.27	32.0 -0.4	46.64 .33	3.2 2.2	55.43 .61	44.9 0.8	5.59 .35	54.0 1.7
24.8	19.80 1.27	32.8 1.1	46.98 .34	5.4 2.2	56.04 .61	46.0 1.3	5.95 .36	55.8 2.0
34.7	21.05+1.23	34.2 -1.7	47.31 +.33	7.5 -2.1	56.64 +.59	47.6 -1.9	6.31 +.36	57.9 -2.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Draconis.		β Camelop. (foll.)		12 Can. Venaticorum.		θ Virginis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 12 <sup>m</sup> 28	+70° 26'	<sup>h</sup> 12 <sup>m</sup> 48	+81° 3'	<sup>h</sup> 12 <sup>m</sup> 50	+38° 57'	<sup>h</sup> 13 <sup>m</sup> 3	-4° 53'
(Dec. 30.7)	20.46 +.76	51.8 -1.1	17.68+2.16	45.5 -1.0	22.90 +.39	59.9 -1.9	41.88 +.34	38.9 -2.1
Jan. 9.7	21.22 .75	51.1 -0.4	19.86 2.18	44.9 +0.3	23.29 .39	58.2 1.5	42.22 .34	41.0 2.1
19.7	21.96 .73	51.0 +0.9	22.03 2.13	44.9 -0.3	23.68 .38	57.0 0.9	42.55 .32	43.1 2.0
29.7	22.65 .66	51.6 0.9	24.11 2.00	45.5 1.0	24.04 .35	56.3 -0.4	42.86 .30	45.0 1.9
Feb. 8.6	23.27 .58	52.8 1.5	26.01 1.79	46.8 1.6	24.37 .31	56.2 +0.1	43.15 .27	46.8 1.6
18.6	23.81 .48	54.5 2.0	27.67 1.51	48.7 2.1	24.67 .27	56.5 0.6	43.41 .24	48.3 1.4
28.6	24.23 .37	56.7 2.4	29.03 1.19	51.0 2.5	24.91 .22	57.4 1.1	43.62 .20	49.6 1.2
Mar. 10.6	24.54 .25	59.3 2.7	30.03 0.82	53.7 2.8	25.11 .17	58.7 1.5	43.81 .16	50.7 0.9
20.5	24.72 +.12	62.1 2.9	30.66 0.43	56.7 3.0	25.25 .12	60.4 1.8	43.95 .13	51.5 0.7
30.5	24.79 .00	65.1 3.0	30.89+0.03	59.8 3.1	25.34 .07	62.3 2.0	44.06 .09	52.0 0.4
Apr. 9.5	24.73 -.11	68.0 2.9	30.72-0.36	62.9 3.1	25.39 +.02	64.3 2.1	44.14 .06	52.3 -0.2
19.4	24.56 .22	70.9 2.8	30.17 0.72	65.8 2.9	25.39 -.02	66.5 2.2	44.18 +.03	52.4 0.0
29.4	24.30 .31	73.5 2.5	29.28 1.04	68.7 2.6	25.35 .05	68.7 2.1	44.20 .00	52.3 +0.1
May 9.4	23.95 .39	75.9 2.2	28.08 1.35	71.1 2.3	25.28 .09	70.7 2.0	44.19 -.02	52.1 0.3
19.4	23.53 .45	77.9 1.7	26.60 1.59	73.2 1.8	25.18 .11	72.6 1.8	44.17 .04	51.8 0.4
29.3	23.06 .49	79.4 1.3	24.92 1.77	74.8 1.3	25.05 .13	74.3 1.5	44.12 .06	51.3 0.5
June 8.3	22.56 .52	80.4 0.8	23.07 1.90	75.8 0.8	24.91 .15	75.6 1.2	44.05 .07	50.8 0.5
18.3	22.03 .53	80.9 +0.2	21.12 1.98	76.3 -0.2	24.76 .16	76.7 0.9	43.98 .08	50.3 0.6
28.3	21.49 .53	80.9 -0.3	19.12 2.00	76.3 +0.3	24.60 .16	77.4 0.5	43.89 .09	49.7 0.6
July 8.2	20.97 .52	80.3 0.8	17.11 1.98	75.7 0.9	24.43 .17	77.7 +0.1	43.79 .10	49.1 0.6
18.2	20.46 .49	79.3 1.3	15.16 1.91	74.6 1.4	24.26 .16	77.7 -0.2	43.69 .10	48.4 0.6
28.2	19.99 .45	77.7 1.8	13.30 1.80	72.9 1.9	24.10 .16	77.2 0.6	43.58 .10	47.8 0.6
Aug. 7.1	19.56 .40	75.7 2.2	11.58 1.84	70.8 2.4	23.95 .14	76.4 1.0	43.48 .10	47.3 0.5
17.1	19.18 .34	73.2 2.6	10.02 1.45	68.2 2.8	23.82 .13	75.2 1.4	43.39 .09	46.8 0.4
27.1	18.87 .28	70.4 3.0	8.67 1.23	65.3 3.1	23.70 .11	73.7 1.7	43.30 .07	46.4 0.3
Sept. 6.1	18.63 .20	67.2 3.3	7.56 0.98	62.0 3.4	23.61 .08	71.8 2.0	43.24 .05	46.1 +0.2
16.0	18.48 .11	63.8 3.5	6.71 0.71	58.4 3.6	23.55 -.04	69.7 2.3	43.20 -.02	46.0 0.0
26.0	18.41 -.02	60.2 3.7	6.15 0.41	54.7 3.8	23.53 .00	67.2 2.6	43.19 +.01	46.0 -0.1
Oct. 6.0	18.45 +.08	56.5 3.8	5.89-0.10	50.8 3.9	23.55 +.05	64.5 2.8	43.22 .05	46.3 0.4
16.0	18.58 .19	52.7 3.8	5.96+0.23	46.9 3.9	23.62 .10	61.6 3.0	43.29 .09	46.8 0.6
25.9	18.82 .29	48.9 3.7	6.36 0.56	43.1 3.9	23.75 .15	58.5 3.1	43.41 .14	47.5 0.9
Nov. 4.9	19.17 .40	45.2 3.5	7.09 0.89	39.4 3.6	23.92 .20	55.4 3.1	43.57 .18	48.5 1.2
14.9	19.61 .50	41.8 3.3	8.14 1.21	35.9 3.3	24.15 .25	52.2 3.1	43.78 .22	49.8 1.4
24.8	20.16 .59	38.7 2.9	9.49 1.49	32.8 2.9	24.43 .30	49.2 3.0	44.02 .26	51.4 1.7
Dec. 4.8	20.78 .66	35.9 2.5	11.12 1.75	30.1 2.5	24.75 .34	46.3 2.8	44.31 .30	53.2 1.9
14.8	21.47 .71	33.7 2.0	12.08 1.95	27.8 2.0	25.10 .37	43.6 2.5	44.62 .32	55.1 2.0
24.8	22.21 .75	32.0 1.4	15.02 2.10	26.2 1.4	25.48 .38	41.2 2.2	44.94 .33	57.1 2.1
34.7	22.96 +.76	30.9 -0.8	17.16+2.17	25.1 +0.8	25.87 +.39	39.2 -1.7	45.28 +.34	59.2 -2.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Virginis. (Spica.)		$\zeta$ Virginis.		$\eta$ Ursæ Majoris.		$\eta$ Bootis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 13 18	<sup>°</sup> <sup>'</sup> -10 31	<sup>h</sup> <sup>m</sup> 13 28	<sup>°</sup> <sup>'</sup> +0 0	<sup>h</sup> <sup>m</sup> 13 42	<sup>°</sup> <sup>'</sup> +49 54	<sup>h</sup> <sup>m</sup> 13 48	<sup>°</sup> <sup>'</sup> +18 59
(Dec. 30.8)	<sup>s</sup> 49.80 +.34	<sup>"</sup> 48.9 -2.0	<sup>s</sup> 32.27 +.33	<sup>"</sup> 76.7 -2.1	<sup>s</sup> 46.77 +.43	<sup>"</sup> 40.5 -2.2	<sup>s</sup> 55.92 +.33	<sup>"</sup> 64.0 -2.3
Jan. 9.8	50.14 .34	50.9 2.1	32.61 .33	74.6 2.1	47.20 .44	38.5 1.7	56.26 .34	61.8 2.1
19.7	50.48 .33	53.0 2.0	32.94 .33	72.6 1.9	47.64 .44	37.0 1.2	56.60 .34	59.9 1.7
29.7	50.80 .31	55.0 1.9	33.26 .31	70.8 1.7	48.07 .43	36.2 -0.6	56.93 .33	58.3 1.3
Feb. 8.7	51.10 .28	56.9 1.8	33.56 .28	69.2 1.5	48.48 .40	35.9 +0.1	57.25 .30	57.2 0.9
18.7	51.37 .25	56.6 1.6	33.83 .25	67.9 1.2	48.86 .36	36.3 0.7	57.53 .27	56.5 0.5
28.6	51.60 .22	60.1 1.4	34.06 .22	66.8 0.9	49.19 .31	37.3 1.2	57.79 .24	56.2 -0.1
Mar. 10.6	51.80 .18	61.4 1.2	34.27 .18	66.0 0.6	49.48 .26	38.7 1.7	58.02 .21	56.3 +0.3
20.6	51.97 .14	62.5 1.0	34.43 .15	65.6 0.3	49.70 .20	40.6 2.1	58.21 .17	56.8 0.7
30.5	52.09 .11	63.4 0.7	34.57 .11	65.4 -0.1	49.87 .14	42.9 2.4	58.36 .13	57.7 1.0
Apr. 9.5	52.19 .08	64.0 0.5	34.66 .08	65.4 +0.1	49.99 .08	45.4 2.6	58.47 .10	58.8 1.2
19.5	52.25 .05	64.4 0.3	34.73 .05	65.6 0.3	50.04 +.03	48.1 2.7	58.55 .06	60.1 1.4
29.5	52.28 +.02	64.6 -0.1	34.77 +.03	66.0 0.5	50.05 -.02	50.8 2.7	58.60 +.03	61.6 1.5
May 9.4	52.29 .00	64.7 0.0	34.78 .00	66.6 0.6	50.00 .07	53.5 2.6	58.62 .00	63.2 1.6
19.4	52.28 -.03	64.6 +0.1	34.77 -.02	67.2 0.6	49.91 .11	55.9 2.4	58.61 -.02	64.7 1.5
29.4	52.24 .04	64.4 0.3	34.74 .04	67.9 0.7	49.78 .15	58.2 2.1	58.57 .05	66.2 1.5
June 8.3	52.19 .06	64.1 0.4	34.69 .06	68.6 0.7	49.62 .18	60.1 1.8	58.51 .07	67.6 1.3
18.3	52.11 .08	63.7 0.4	34.62 .08	69.3 0.7	49.43 .20	61.7 1.4	58.44 .09	68.9 1.2
28.3	52.03 .09	63.2 0.5	34.54 .09	70.0 0.7	49.21 .22	62.9 1.0	58.34 .10	69.9 1.0
July 8.3	51.93 .10	62.7 0.6	34.44 .10	70.6 0.6	48.99 .24	63.6 +0.5	58.23 .12	70.8 0.7
18.2	51.83 .11	62.1 0.6	34.34 .11	71.2 0.6	48.74 .24	63.9 0.0	58.11 .13	71.4 0.5
28.2	51.72 .11	61.4 0.6	34.23 .11	71.8 0.5	48.50 .24	63.7 -0.4	57.98 .13	71.8 +0.2
Aug. 7.2	51.61 .11	60.8 0.7	34.11 .11	72.2 0.4	48.26 .24	63.1 0.9	57.84 .13	71.9 0.0
17.2	51.50 .10	60.1 0.6	34.01 .10	72.6 0.3	48.02 .23	62.0 1.3	57.71 .13	71.8 -0.3
27.1	51.41 .08	59.5 0.6	33.91 .09	72.8 +0.1	47.80 .21	60.5 1.7	57.59 .12	71.3 0.6
Sept. 6.1	51.33 .07	59.0 0.5	33.82 .07	72.8 0.0	47.61 .18	58.6 2.1	57.48 .10	70.6 0.9
16.1	51.28 -.04	58.6 0.4	33.76 .05	72.7 -0.2	47.44 .14	56.2 2.5	57.39 .08	69.6 1.1
26.0	51.26 .00	58.3 +0.2	33.73 -.02	72.4 0.4	47.32 .10	53.6 2.8	57.32 .04	68.3 1.4
Oct. 6.0	51.27 +.03	58.2 0.0	33.73 +.02	71.9 0.6	47.25 -.05	50.6 3.1	57.30 -.01	66.7 1.7
16.0	51.33 .08	58.3 -0.2	33.78 .07	71.2 0.9	47.23 +.01	47.4 3.3	57.31 +.03	64.9 2.0
26.0	51.43 .13	58.7 0.5	33.86 .11	70.1 1.1	47.27 .07	43.9 3.5	57.37 .08	62.8 2.2
Nov. 4.9	51.58 .17	59.4 0.8	34.00 .16	68.9 1.4	47.38 .14	40.4 3.5	57.47 .13	60.5 2.4
14.9	51.78 .22	60.3 1.1	34.18 .20	67.4 1.6	47.55 .20	36.9 3.5	57.63 .18	58.0 2.5
24.9	52.02 .26	61.5 1.3	34.40 .24	65.6 1.8	47.78 .26	33.4 3.4	57.83 .22	55.5 2.6
Dec. 4.8	52.30 .29	63.0 1.6	34.66 .28	63.7 2.0	48.07 .32	30.0 3.2	58.07 .26	52.8 2.6
14.8	52.60 .32	64.7 1.8	34.96 .31	61.7 2.1	48.42 .37	26.9 2.9	58.35 .30	50.2 2.6
24.8	52.93 .34	66.6 1.9	35.28 .33	59.6 2.1	48.81 .40	24.2 2.5	58.66 .32	47.7 2.5
34.8	53.27 +.34	68.6 -2.0	35.61 +.33	57.5 -2.1	49.22 +.43	21.9 -2.1	58.99 +.30	45.3 -2.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Centauri.		$\alpha$ Draconis.		$\alpha$ Bootis. (Arcturus.)		$\theta$ Bootis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 13	<sup>m</sup> 55	<sup>h</sup> 14	<sup>m</sup> 1	<sup>h</sup> 14	<sup>m</sup> 10	<sup>h</sup> 14	<sup>m</sup> 21
		<sup>s</sup> -59° 47'		<sup>s</sup> +64° 56'		<sup>s</sup> +19° 48'		<sup>s</sup> +52° 23'
(Dec. 30.8)	17.53 +.58	9.9 -0.5	6.76 +.55	49.0 -2.3	8.87 +.33	33.6 -2.4	4.56 +.41	75.8 -2.6
Jan. 9.8	18.11 .59	10.6 1.0	7.34 .59	47.0 1.7	9.20 .34	31.2 2.2	4.98 .43	73.4 2.1
19.8	18.70 .58	11.9 1.4	7.94 .60	45.6 1.1	9.54 .34	29.2 1.9	4.43 .45	71.6 1.5
29.7	19.27 .56	13.5 1.9	8.54 .59	44.9 -0.4	9.87 .33	27.5 1.5	5.88 .44	70.4 0.9
Feb. 8.7	19.81 .59	15.6 2.2	9.12 .57	44.9 +0.3	10.19 .31	26.3 1.0	6.31 .43	69.8 -0.3
18.7	20.32 .48	18.0 2.5	9.67 .59	45.5 0.9	10.49 .39	25.4 0.6	6.73 .40	69.9 +0.4
28.6	20.77 .43	20.6 2.7	10.16 .46	46.7 1.5	10.76 .36	25.1 -0.1	7.11 .36	70.5 1.0
Mar. 10.6	21.18 .37	23.4 2.9	10.58 .36	48.4 2.0	11.00 .32	25.1 +0.3	7.45 .31	71.8 1.5
20.6	21.52 .39	26.4 3.0	10.92 .30	50.7 2.4	11.20 .19	25.6 0.7	7.73 .36	73.6 2.0
30.6	21.81 .35	29.4 3.0	11.18 .21	53.3 2.8	11.37 .15	26.4 1.0	7.96 .30	75.8 2.4
Apr. 9.5	22.03 .19	32.4 3.0	11.35 .12	56.2 3.0	11.51 .12	27.6 1.3	8.13 .14	78.3 2.6
19.5	22.20 .13	35.4 2.9	11.43 +.04	59.3 3.1	11.61 .06	28.9 1.4	8.24 .06	81.0 2.8
29.5	22.30 .07	38.2 2.8	11.42 -.06	62.3 3.0	11.67 .05	30.5 1.6	8.29 +.02	83.9 2.9
May 9.4	22.35 +.02	40.9 2.6	11.33 .13	65.3 2.9	11.71 +.02	32.1 1.6	8.29 -.03	86.7 2.8
19.4	22.34 -.04	43.4 2.3	11.17 .30	68.1 2.7	11.71 -.01	33.7 1.6	8.24 .06	89.5 2.7
29.4	22.37 .09	45.6 2.0	10.94 .36	70.6 2.3	11.69 .03	35.3 1.5	8.14 .19	92.1 2.5
June 8.4	22.15 .14	47.4 1.7	10.64 .32	72.8 2.0	11.64 .06	36.8 1.4	7.99 .16	94.4 2.2
18.3	21.98 .19	49.0 1.3	10.30 .36	74.5 1.5	11.57 .06	38.1 1.3	7.81 .30	96.4 1.8
28.3	21.77 .33	50.1 0.9	9.92 .40	75.8 1.0	11.48 .10	39.3 1.1	7.60 .33	98.0 1.4
July 8.3	21.53 .36	50.8 -0.5	9.51 .42	76.6 +0.5	11.37 .12	40.2 0.8	7.36 .35	99.1 0.9
18.3	21.25 .39	51.1 0.0	9.08 .43	76.9 0.0	11.25 .13	40.9 0.6	7.09 .37	99.8 +0.5
28.2	20.95 .30	50.9 +0.4	8.64 .44	76.6 -0.5	11.11 .14	41.4 +0.3	6.82 .36	100.0 0.0
Aug. 7.2	20.65 .30	50.3 0.8	8.21 .43	75.9 1.0	10.97 .14	41.5 0.0	6.53 .36	99.8 -0.5
17.2	20.35 .39	49.3 1.2	7.78 .41	74.0 1.5	10.83 .14	41.4 -0.3	6.25 .36	99.1 1.0
27.1	20.07 .37	47.8 1.6	7.38 .30	72.9 2.0	10.69 .14	41.0 0.5	5.97 .37	97.8 1.4
Sept. 6.1	19.82 .33	46.0 2.0	7.01 .35	70.7 2.4	10.56 .12	40.3 0.8	5.72 .34	96.2 1.9
16.1	19.62 .17	43.9 2.2	6.69 .30	68.1 2.8	10.44 .10	39.3 1.1	5.49 .31	94.1 2.3
26.1	19.47 .11	41.6 2.4	6.42 .32	65.1 3.1	10.36 .07	38.0 1.4	5.30 .17	91.6 2.7
Oct. 6.0	19.40 -.03	39.2 2.4	6.23 .16	61.8 3.4	10.31 -.03	36.4 1.7	5.15 .12	88.8 3.0
16.0	19.42 +.06	36.8 2.4	6.11 -.08	58.3 3.6	10.29 +.01	34.6 2.0	5.06 -.06	85.6 3.3
26.0	19.52 .14	34.4 2.3	6.08 +.01	54.6 3.8	10.32 .06	32.5 2.2	5.03 .00	82.3 3.5
Nov. 5.0	19.71 .33	32.2 2.1	6.14 .11	50.8 3.6	10.40 .10	30.1 2.4	5.07 +.07	78.7 3.6
14.9	19.98 .32	30.3 1.7	6.29 .30	47.0 3.8	10.53 .15	27.6 2.6	5.18 .14	75.0 3.6
24.9	20.35 .40	26.8 1.3	6.54 .30	43.2 3.6	10.71 .30	24.9 2.7	5.36 .21	71.4 3.6
Dec. 4.9	20.79 .47	27.7 0.9	6.88 .36	39.7 3.4	10.94 .34	22.2 2.7	5.60 .28	67.9 3.5
14.8	21.29 .59	27.0 +0.4	7.31 .46	36.5 3.0	11.20 .28	19.5 2.7	5.91 .33	64.5 3.2
24.8	21.83 .56	26.9 -0.1	7.80 .52	33.7 2.6	11.50 .31	16.8 2.5	6.27 .36	61.5 2.8
34.8	22.40 +.58	27.3 -0.6	8.35 +.57	31.4 -2.1	11.82 +.32	14.4 -2.3	6.67 +.42	58.8 -2.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*5 Ursæ Minoris.		α Centauri.		ε Bootis.		α Libræ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 14 <sup>m</sup> 27	<sup>°</sup> +76 <sup>'</sup> 13	<sup>h</sup> 14 <sup>m</sup> 31	<sup>°</sup> -60 <sup>'</sup> 19	<sup>h</sup> 14 <sup>m</sup> 39	<sup>°</sup> +27 <sup>'</sup> 34	<sup>h</sup> 14 <sup>m</sup> 44	<sup>°</sup> -15 <sup>'</sup> 32
(Dec. 30.8)	<sup>s</sup> 46.27 +.89	<sup>"</sup> 34.9 -2.4	<sup>s</sup> 24.09 +.56	<sup>"</sup> 47.4 0.0	<sup>s</sup> 42.28 +.31	<sup>"</sup> 50.5 -2.6	<sup>s</sup> 11.29 +.39	<sup>"</sup> 19.4 -1.5
Jan. 9.8	47.15 .91	32.8 1.8	24.66 .58	47.6 -0.4	42.61 .34	48.1 2.3	11.63 .34	21.0 1.6
19.8	48.09 .96	31.3 1.2	25.25 .58	48.2 0.9	42.95 .35	46.0 1.9	11.97 .34	22.6 1.6
29.7	49.06 .98	30.5 -0.5	25.83 .58	49.4 1.3	43.30 .34	44.3 1.4	12.31 .34	24.2 1.6
Feb. 8.7	50.04 .98	30.3 +0.2	26.40 .55	50.9 1.7	43.64 .33	43.1 0.9	12.64 .33	25.8 1.6
18.7	50.97 .90	30.9 0.8	26.93 .52	52.8 2.0	43.96 .31	42.4 -0.4	12.96 .31	27.4 1.5
28.7	51.84 .89	32.0 1.5	27.43 .48	55.0 2.3	44.28 .29	42.2 +0.1	13.26 .28	28.8 1.3
Mar. 10.6	52.60 .70	33.8 2.0	27.89 .43	57.4 2.5	44.53 .25	42.5 0.6	13.53 .26	30.0 1.1
20.6	53.24 .57	36.0 2.5	28.29 .37	60.0 2.7	44.77 .22	43.3 1.0	13.77 .23	31.0 1.0
30.6	53.73 .49	38.7 2.8	28.64 .32	62.8 2.8	44.97 .18	44.5 1.4	13.98 .20	31.9 0.8
Apr. 9.6	54.08 .36	41.6 3.0	28.93 .26	65.6 2.8	45.14 .15	46.0 1.7	14.16 .17	32.6 0.6
19.5	54.25 +.10	44.7 3.2	29.10 .20	68.4 2.8	45.27 .11	47.9 1.9	14.32 .14	33.1 0.4
29.5	54.27 -.06	47.9 3.2	29.32 .14	71.1 2.7	45.36 .08	49.8 2.0	14.44 .11	33.5 0.3
May 9.5	54.13 .29	51.1 3.1	29.43 .08	73.8 2.6	45.42 .04	51.9 2.1	14.53 .08	33.7 -0.2
19.4	53.84 .36	54.0 2.8	29.48 +.02	76.3 2.4	45.44 +.01	54.1 2.1	14.60 .05	33.8 0.0
29.4	53.42 .49	56.7 2.5	29.47 -.04	78.6 2.2	45.44 -.02	56.2 2.0	14.64 +.02	33.8 +0.1
June 8.4	52.87 .60	59.1 2.2	29.39 .10	80.7 1.9	45.40 .05	58.1 1.9	14.65 -.01	33.7 0.1
18.4	52.22 .70	61.0 1.7	29.20 .16	82.4 1.6	45.34 .08	59.9 1.7	14.63 .03	33.5 0.2
28.3	51.48 .77	62.5 1.2	29.08 .21	83.9 1.2	45.25 .10	61.5 1.4	14.58 .06	33.3 0.3
July 8.3	50.68 .83	63.5 0.7	28.85 .25	84.9 0.8	45.13 .12	62.8 1.1	14.51 .08	32.9 0.4
18.3	49.82 .87	64.0 +0.2	28.58 .29	85.5 -0.4	45.00 .14	63.7 0.8	14.41 .10	32.5 0.4
28.3	48.94 .89	63.9 -0.3	28.28 .31	85.7 0.0	44.84 .16	64.4 0.5	14.30 .12	32.1 0.5
Aug 7.2	48.05 .88	63.3 0.9	27.95 .33	85.5 +0.5	44.68 .17	64.7 +0.1	14.17 .13	31.6 0.6
17.2	47.18 .86	62.2 1.4	27.61 .33	84.8 0.9	44.51 .17	64.7 -0.2	14.04 .14	31.0 0.5
27.2	46.34 .82	60.5 1.9	27.29 .32	83.7 1.3	44.34 .17	64.3 0.5	13.90 .14	30.5 0.6
Sept. 6.1	45.55 .75	58.4 2.2	26.99 .29	82.2 1.7	44.18 .15	63.6 0.9	13.76 .13	29.9 0.5
16.1	44.83 .67	55.9 2.7	26.72 .24	80.4 2.0	44.04 .13	62.5 1.3	13.65 .11	29.4 0.5
26.1	44.21 .57	53.0 3.1	26.51 .18	78.3 2.2	43.91 .11	61.1 1.6	13.55 .08	28.9 0.4
Oct. 6.1	43.70 .45	49.7 3.4	26.36 .11	76.0 2.4	43.82 .07	59.3 1.9	13.49 -.05	28.6 0.3
16.0	43.31 .32	46.2 3.6	26.30 -.02	73.5 2.4	43.77 -.03	57.2 2.2	13.40 .00	28.3 +0.1
26.0	43.07 .17	42.5 2.8	26.32 +.07	71.1 2.4	43.76 +.02	54.9 2.5	13.48 +.04	28.3 0.0
Nov. 5.0	42.98 -.01	38.7 3.8	26.43 .16	68.8 2.2	43.81 .07	52.2 2.7	13.55 .09	28.4 -0.3
15.0	43.06 +.16	34.8 3.8	26.63 .25	66.7 2.0	43.90 .12	49.5 2.9	13.67 .12	28.8 0.5
24.9	43.30 .32	31.1 3.7	26.93 .34	64.8 1.7	44.05 .17	46.5 2.9	13.84 .19	29.4 0.7
Dec. 4.0	43.71 .48	27.5 3.5	27.31 .42	63.3 1.3	44.25 .22	43.6 3.0	14.06 .24	30.3 1.0
14.9	44.27 .63	24.2 3.1	27.76 .48	62.2 0.8	44.49 .26	40.6 2.9	14.32 .28	31.4 1.2
24.8	44.97 .78	21.3 2.7	28.27 .53	61.6 +0.4	44.77 .30	37.8 2.7	14.61 .31	32.7 1.4
34.8	45.78 +.86	18.8 -2.1	28.83 +.57	61.5 -0.1	45.09 +.32	35.2 -2.4	14.93 +.33	34.1 -1.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Ursa Minoris.		$\beta$ Bootis.		$\beta$ Libræ.		$\mu$ Bootis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 14 50	<sup>m</sup> +74° 36'	<sup>h</sup> 14 57	<sup>m</sup> +40° 51'	<sup>h</sup> 15 10	<sup>m</sup> -8° 56'	<sup>h</sup> 15 19	<sup>m</sup> +37° 47'
(Dec. 30.8)	<sup>s</sup> 62.37 +.70	<sup>s</sup> 34.1 -2.6	<sup>s</sup> 23.09 +.33	<sup>s</sup> 47.7 -2.8	<sup>s</sup> 29.84 +.30	<sup>s</sup> 11.9 -1.6	<sup>s</sup> 54.92 +.30	<sup>s</sup> 51.2 -2.9
Jan. 9.8	63.12 .79	31.8 2.1	23.44 .36	45.0 2.4	30.16 .32	13.6 1.6	55.23 .33	48.4 2.6
19.8	63.94 .85	30.0 1.5	23.80 .37	42.8 2.0	30.48 .33	15.2 1.6	55.58 .35	46.1 2.1
29.8	64.81 .88	28.8 0.8	24.18 .38	41.1 1.4	30.81 .33	16.8 1.5	55.94 .36	44.2 1.6
Feb. 8.7	65.69 .88	28.3 -0.1	24.56 .37	40.0 0.8	31.14 .32	18.3 1.4	56.30 .36	42.8 1.1
18.7	66.56 .84	28.5 +0.5	24.92 .35	39.4 -0.2	31.46 .31	19.6 1.2	56.66 .35	42.1 -0.5
28.7	67.37 .78	29.3 1.2	25.26 .33	39.5 +0.4	31.76 .29	20.7 1.0	57.00 .33	41.9 +0.1
Mar. 10.7	68.11 .69	30.8 1.8	25.58 .30	40.1 0.9	32.03 .27	21.7 0.8	57.31 .30	42.3 0.7
20.6	68.75 .58	32.9 2.3	25.86 .26	41.3 1.4	32.29 .24	22.4 0.6	57.60 .27	43.2 1.2
30.6	69.27 .45	35.3 2.7	26.10 .22	43.0 1.8	32.51 .21	22.8 0.4	57.85 .24	44.7 1.6
Apr. 9.6	69.66 .32	38.1 3.0	26.29 .17	45.0 2.2	32.71 .19	23.1 -0.2	58.07 .20	46.5 2.0
19.5	69.90 .17	41.2 3.1	26.44 .13	47.4 2.5	32.89 .16	23.2 0.0	58.25 .16	48.7 2.3
29.5	70.01 +.03	44.4 3.2	26.55 .09	49.9 2.6	33.03 .13	23.1 +0.2	58.38 .12	51.2 2.5
May 9.5	69.97 -1.1	47.6 3.2	26.62 +.04	52.6 2.7	33.15 .10	22.8 0.3	58.48 .07	53.8 2.6
19.5	69.79 .24	50.7 3.0	26.64 .00	55.2 2.6	33.24 .07	22.5 0.4	58.53 +.03	56.4 2.6
29.4	69.49 .37	53.6 2.8	26.63 -.04	57.8 2.5	33.29 .04	22.0 0.5	58.55 .00	59.0 2.6
June 8.4	69.06 .48	56.2 2.4	26.57 .07	60.2 2.3	33.32 +.01	21.6 0.5	58.52 -.04	61.5 2.4
18.4	68.53 .57	58.4 2.0	26.48 .11	62.4 2.0	33.32 -.02	21.0 0.5	58.46 .08	63.8 2.2
28.4	67.92 .66	60.2 1.6	26.36 .14	64.3 1.7	33.29 .04	20.5 0.5	58.37 .11	65.9 1.9
July 8.3	67.23 .72	61.5 1.1	26.21 .17	65.9 1.4	33.23 .07	20.0 0.5	58.24 .14	67.6 1.6
18.3	66.48 .77	62.4 +0.6	26.03 .19	67.1 1.0	33.15 .09	19.4 0.5	58.08 .17	69.0 1.2
28.3	65.70 .80	62.7 0.0	25.83 .21	67.8 0.6	33.05 .11	18.9 0.5	57.90 .19	70.1 0.8
Aug. 7.2	64.89 .81	62.4 -0.5	25.61 .22	68.2 +0.1	32.92 .13	18.4 0.5	57.70 .21	70.7 +0.4
17.2	64.08 .80	61.7 1.0	25.39 .22	68.1 -0.3	32.79 .14	17.9 0.4	57.48 .22	70.9 0.0
27.2	63.29 .78	60.4 1.5	25.16 .22	67.6 0.7	32.64 .14	17.5 0.4	57.27 .22	70.6 -0.4
Sept. 6.2	62.54 .73	58.6 2.0	24.95 .21	66.6 1.2	32.50 .14	17.1 0.3	57.05 .21	70.0 0.9
16.1	61.84 .67	56.4 2.4	24.75 .19	65.2 1.6	32.37 .12	16.8 0.2	56.84 .20	68.9 1.3
26.1	61.21 .58	53.8 2.8	24.57 .16	63.4 2.0	32.26 .10	16.7 +0.1	56.65 .17	67.4 1.7
Oct. 6.1	60.67 .48	50.8 3.2	24.42 .12	61.2 2.3	32.17 .07	16.6 0.0	56.50 .14	65.5 2.1
16.1	60.25 .37	47.4 3.5	24.32 .08	58.7 2.7	32.12 -.03	16.8 -0.2	56.38 .10	63.2 2.4
26.0	59.95 .23	43.8 3.7	24.27 -.02	55.9 3.0	32.11 +.01	17.0 0.4	56.30 -.05	60.6 2.7
Nov. 5.0	59.78 -.09	40.1 3.8	24.27 +.03	52.8 3.2	32.15 .06	17.6 0.6	56.22 +.01	57.7 3.0
15.0	59.77 +.06	36.3 3.8	24.33 .09	49.5 3.3	32.24 .11	18.3 0.8	56.32 .06	54.6 3.2
24.9	59.91 .21	32.5 3.8	24.46 .15	46.1 3.4	32.38 .16	19.2 1.0	56.41 .12	51.4 3.3
Dec. 4.9	60.20 .37	28.8 3.6	24.64 .21	42.7 3.4	32.57 .21	20.3 1.2	56.56 .18	48.1 3.3
14.9	60.64 .51	25.3 3.3	24.87 .26	39.4 3.2	32.80 .25	21.6 1.4	56.77 .23	44.8 3.2
24.9	61.21 .63	22.2 2.9	25.16 .30	36.3 3.0	33.07 .28	23.1 1.5	57.03 .28	41.7 3.1
34.8	61.90 +.74	19.5 -2.4	25.48 +.34	33.5 -2.6	33.36 +.31	24.7 -1.6	57.33 +.31	38.7 -2.8



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	* $\gamma$ Ursæ Minoris.		$\alpha$ Coronæ Borealis.		$\alpha$ Serpentina.		$\epsilon$ Serpentina.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 15 <sup>m</sup> 20	<sup>°</sup> +72 <sup>'</sup> 15	<sup>h</sup> 15 <sup>m</sup> 29	<sup>°</sup> +27 <sup>'</sup> 6	<sup>h</sup> 15 <sup>m</sup> 38	<sup>°</sup> +6 <sup>'</sup> 48	<sup>h</sup> 15 <sup>m</sup> 44	<sup>°</sup> +4 <sup>'</sup> 50
(Dec. 30.9)	<sup>s</sup> 53.59 +.56	<sup>"</sup> 30.5 -2.9	<sup>s</sup> 33.69 +.38	<sup>"</sup> 68.1 -2.8	<sup>s</sup> 18.37 +.37	<sup>"</sup> 17.6 -2.1	<sup>s</sup> 46.99 +.37	<sup>"</sup> 26.2 -2.1
Jan. 9.8	54.19 .65	27.8 2.4	33.98 .31	65.5 2.5	18.66 .30	15.5 2.0	47.27 .29	24.2 2.0
19.8	54.88 .73	25.6 1.9	34.30 .33	63.2 2.1	18.96 .31	13.5 1.9	47.57 .31	22.3 1.8
29.8	55.62 .76	24.1 1.2	34.63 .33	61.2 1.7	19.28 .32	11.8 1.6	47.89 .32	20.6 1.6
Feb. 8.8	56.39 .77	23.2 -0.6	34.97 .33	59.8 1.2	19.60 .32	10.3 1.3	48.20 .31	19.1 1.3
18.7	57.16 .76	22.9 +0.1	35.30 .32	58.8 0.7	19.91 .31	9.1 1.0	48.52 .31	17.9 1.0
28.7	57.90 .73	23.4 0.8	35.61 .31	58.3 -0.2	20.21 .29	8.3 0.6	48.82 .29	17.1 0.7
Mar. 10.7	58.59 .66	24.5 1.4	35.91 .29	58.4 +0.3	20.50 .27	7.8 -0.3	49.11 .28	16.6 -0.3
20.6	59.21 .58	26.1 2.0	36.18 .26	58.9 0.8	20.76 .25	7.7 +0.1	49.37 .26	16.4 0.0
30.6	59.74 .48	28.4 2.4	36.43 .23	60.0 1.2	21.00 .23	8.0 0.4	49.62 .23	16.6 +0.3
Apr. 9.6	60.17 .37	31.0 2.8	36.64 .20	61.4 1.6	21.21 .20	8.5 0.7	49.84 .21	17.1 0.6
19.6	60.48 .28	33.9 3.1	36.82 .16	63.2 1.9	21.40 .17	9.3 0.9	50.03 .18	17.8 0.8
29.5	60.67 .13	37.1 3.2	36.97 .13	65.2 2.1	21.56 .15	10.4 1.1	50.20 .15	18.7 1.0
May 9.5	60.74 +.01	40.3 3.2	37.08 .09	67.4 2.2	21.69 .12	11.6 1.3	50.34 .12	19.9 1.2
19.5	60.68 -1.1	43.6 3.2	37.16 .06	69.6 2.3	21.80 .09	12.9 1.3	50.45 .09	21.1 1.3
29.5	60.51 .22	46.6 3.0	37.20 +.02	71.9 2.3	21.87 .06	14.3 1.4	50.52 .06	22.4 1.3
June 8.4	60.23 .33	49.5 2.7	37.21 -.01	74.1 2.2	21.91 +.02	15.7 1.4	50.57 +.03	23.7 1.3
18.4	59.85 .43	52.1 2.4	37.18 .04	76.2 2.0	21.92 -.01	17.0 1.3	50.59 .00	25.0 1.2
28.4	59.38 .51	54.3 2.0	37.12 .07	78.1 1.8	21.90 .04	18.3 1.2	50.58 -.03	26.2 1.2
July 8.3	58.83 .58	56.0 1.5	37.03 .10	79.8 1.5	21.85 .06	19.4 1.1	50.53 .06	27.3 1.0
18.3	58.22 .64	57.3 1.0	36.92 .13	81.1 1.2	21.77 .09	20.4 0.9	50.46 .09	28.3 0.9
28.3	57.56 .68	58.1 +0.5	36.78 .15	82.2 0.9	21.66 .11	21.3 0.8	50.36 .11	29.1 0.8
Aug. 7.3	56.87 .70	58.3 0.0	36.61 .17	82.9 0.5	21.54 .13	22.0 0.6	50.24 .13	29.8 0.6
17.2	56.16 .71	58.1 -0.5	36.44 .18	83.3 +0.2	21.40 .15	22.5 0.4	50.10 .15	30.3 0.4
27.2	55.44 .71	57.3 1.0	36.25 .19	83.3 -0.2	21.25 .15	22.7 +0.2	49.95 .15	30.6 +0.2
Sept. 6.2	54.75 .66	56.0 1.5	36.07 .18	82.9 0.5	21.09 .15	22.8 0.0	49.79 .15	30.8 0.0
16.2	54.09 .64	54.2 2.0	35.89 .17	82.2 0.9	20.94 .14	22.7 -0.2	49.64 .15	30.7 -0.2
26.1	53.48 .57	52.0 2.5	35.73 .15	81.1 1.3	20.81 .12	22.3 0.5	49.50 .13	30.4 0.4
Oct. 6.1	52.94 .50	49.3 2.8	35.59 .12	79.6 1.6	20.69 .10	21.7 0.7	49.39 .16	29.9 0.6
16.1	52.49 .40	46.3 3.2	35.49 .08	77.8 2.0	20.61 .06	20.9 1.0	49.30 .07	29.1 0.9
26.0	52.14 .29	42.9 3.5	35.43 -.04	75.7 2.3	20.57 -.02	19.8 1.2	49.26 -.02	28.2 1.1
Nov. 5.0	51.91 .17	39.3 3.7	35.42 +.01	73.3 2.5	20.57 +.03	18.4 1.5	49.25 +.02	27.0 1.3
15.0	51.81 -.02	35.6 3.8	35.46 .07	70.7 2.7	20.62 .07	16.9 1.7	49.30 .07	25.5 1.5
25.0	51.84 +.10	31.8 3.8	35.55 .12	67.9 2.9	20.72 .12	15.1 1.9	49.39 .12	23.9 1.7
Dec. 4.9	52.01 .24	28.0 3.7	35.69 .17	64.9 3.0	20.87 .17	13.1 2.0	49.54 .17	22.0 1.9
14.9	52.32 .37	24.4 3.5	35.89 .22	62.0 2.9	21.07 .22	11.1 2.1	49.73 .21	20.1 2.0
24.9	52.75 .49	21.1 3.2	36.13 .26	59.1 2.8	21.30 .25	9.0 2.1	49.96 .25	18.1 2.0
34.9	53.29 +.60	18.1 -2.7	36.40 +.29	56.4 -2.6	21.57 +.28	6.9 -2.1	50.22 +.28	16.1 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Ursa Minoris.		ε Coronæ Borealis.		δ Scorpis.		β <sup>1</sup> Scorpis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 15 48	<sup>m</sup> +78° 9'	<sup>h</sup> 15 52	<sup>m</sup> +27° 13'	<sup>h</sup> 15 53	<sup>m</sup> -22° 16'	<sup>h</sup> 15 56	<sup>m</sup> -19° 26'
(Dec. 30.9)	<sup>s</sup> 90.07 +.68	<sup>s</sup> 36.5 -3.1	<sup>s</sup> 34.45 +.36	<sup>s</sup> 32.4 -2.8	<sup>s</sup> 10.64 +.39	<sup>s</sup> 34.2 -0.8	<sup>s</sup> 23.95 +.39	<sup>s</sup> 25.6 -0.9
Jan. 9.8	20.81 .81	33.7 2.6	34.73 .89	29.7 2.5	10.95 .39	35.1 0.9	24.25 .31	26.6 1.0
19.8	21.70 .93	31.3 2.1	35.04 .31	27.3 2.2	11.29 .34	36.0 1.0	24.57 .33	27.7 1.1
29.8	22.69 1.03	29.5 1.5	35.36 .33	25.3 1.8	11.63 .35	37.1 1.1	24.91 .34	28.8 1.1
Feb. 8.8	23.75 1.08	28.3 0.8	35.69 .33	23.7 1.4	11.98 .35	38.2 1.1	25.25 .34	29.9 1.1
18.7	24.85 1.10	27.8 -0.2	36.02 .38	22.5 0.8	12.32 .34	39.3 1.1	25.59 .33	31.0 1.1
28.7	25.94 1.07	28.0 +0.5	36.34 .31	22.0 -0.3	12.65 .33	40.4 1.0	25.92 .39	32.0 1.0
Mar. 10.7	26.98 1.00	28.8 1.1	36.64 .30	21.9 +0.2	12.97 .31	41.4 0.9	26.23 .30	32.9 0.9
20.7	27.93 .90	30.2 1.7	36.93 .37	22.4 0.7	13.27 .39	42.3 0.8	26.52 .39	33.7 0.7
30.6	28.77 .77	32.2 2.2	37.19 .35	23.3 1.1	13.55 .38	43.1 0.7	26.80 .38	34.4 0.6
Apr. 9.6	29.47 .62	34.7 2.7	37.42 .29	24.7 1.6	13.80 .34	43.8 0.6	27.05 .34	34.9 0.5
19.6	30.00 .45	37.5 3.0	37.62 .18	26.4 1.9	14.03 .31	44.4 0.5	27.28 .31	35.3 0.4
29.6	30.36 .37	40.6 3.2	37.79 .15	28.5 2.1	14.23 .19	44.9 0.4	27.48 .19	35.7 0.3
May 9.5	30.53 +.08	43.8 3.2	37.93 .12	30.7 2.3	14.40 .16	45.3 0.3	27.65 .16	35.9 0.2
19.5	30.52 -1.10	47.1 3.2	38.03 .08	33.0 2.4	14.54 .12	45.6 0.3	27.80 .13	36.0 -0.1
29.5	30.32 .38	50.3 3.1	38.09 .05	35.4 2.4	14.65 .09	45.8 0.2	27.91 .09	36.1 0.0
June 8.4	29.95 .45	53.3 2.9	38.12 +.01	37.7 2.3	14.72 .06	46.0 0.1	27.99 .06	36.1 0.0
18.4	29.42 .80	56.0 2.6	38.12 -.02	39.9 2.1	14.76 +.02	46.1 -0.1	28.03 +.03	36.0 0.0
28.4	28.75 .74	58.4 2.2	38.07 .06	42.0 1.9	14.77 -.01	46.2 0.0	28.04 -.01	36.0 +0.1
July 8.4	27.94 .86	60.5 1.8	38.00 .09	43.8 1.7	14.74 .05	46.2 0.0	28.01 .04	35.8 0.1
18.3	27.02 .96	62.0 1.3	37.89 .12	45.3 1.4	14.67 .08	46.1 +0.1	27.95 .07	35.7 0.2
28.3	26.02 1.04	63.1 0.8	37.76 .15	46.6 1.1	14.58 .11	46.0 0.2	27.86 .10	35.4 0.2
Aug. 7.3	24.95 1.09	63.7 +0.3	37.60 .17	47.5 0.7	14.46 .13	45.7 0.3	27.75 .13	35.2 0.3
17.3	23.83 1.12	63.8 -0.2	37.42 .18	48.0 +0.4	14.31 .15	45.4 0.3	27.61 .15	34.9 0.3
27.2	22.71 1.13	63.4 0.7	37.23 .19	48.2 0.0	14.16 .16	45.0 0.4	27.45 .16	34.5 0.4
Sept. 6.2	21.59 1.10	62.4 1.2	37.04 .19	48.1 -0.3	13.99 .16	44.6 0.5	27.29 .16	34.1 0.4
16.2	20.50 1.06	60.9 1.7	36.85 .18	47.5 0.7	13.84 .15	44.1 0.5	27.13 .15	33.6 0.4
26.1	19.48 .98	59.0 2.2	36.67 .17	46.6 1.1	13.69 .13	43.5 0.5	26.99 .13	33.2 0.4
Oct. 6.1	18.54 .88	56.6 2.6	36.52 .14	45.3 1.5	13.57 .11	43.0 0.5	26.87 .11	32.7 0.4
16.1	17.73 .75	53.9 2.9	36.39 .11	43.7 1.8	13.48 .07	42.4 0.5	26.78 .07	32.3 0.4
26.1	17.05 .60	50.8 3.3	36.31 .06	41.7 2.1	13.43 -.02	42.0 0.4	26.72 -.03	32.0 0.3
Nov. 5.0	16.54 .43	47.4 3.5	36.27 -.01	39.4 2.4	13.44 +.03	41.6 0.3	26.72 +.02	31.8 +0.1
15.0	16.20 .34	43.8 3.6	36.29 +.04	36.8 2.7	13.49 .08	41.4 +0.1	26.77 .07	31.8 0.0
25.0	16.06 -.05	40.1 3.7	36.35 .09	34.0 2.8	13.60 .13	41.4 -0.1	26.87 .13	31.9 -0.2
Dec. 4.9	16.12 +.16	36.4 3.7	36.47 .14	31.2 2.9	13.76 .19	41.6 0.3	27.02 .18	32.2 0.4
14.9	16.38 .36	32.8 3.5	36.64 .19	28.2 2.9	13.97 .23	41.9 0.5	27.22 .22	32.8 0.6
24.9	16.83 .55	29.4 3.3	36.86 .24	25.3 2.9	14.23 .27	42.5 0.7	27.47 .26	33.4 0.8
34.9	17.47 +.72	26.3 -2.9	37.11 +.27	22.5 -2.7	14.52 +.30	43.2 -0.8	27.75 +.29	34.3 -0.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*Groombridge 2320.		δ Ophiuchi.		τ Herculis.		α Scorpii. (Antares.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 16	<sup>m</sup> 5	<sup>h</sup> 16	<sup>m</sup> 8	<sup>h</sup> 16	<sup>m</sup> 16	<sup>h</sup> 16	<sup>m</sup> 21
(Dec. 30.9)	57.20 +.38	25.4 -3.3	0.10 +.26	59.4 -1.6	5.15 +.27	51.8 -3.2	59.15 +.29	45.0 -0.4
Jan. 9.9	57.63 .47	22.3 2.9	0.38 .29	61.0 1.6	5.44 .31	48.7 2.9	59.45 .31	45.4 0.5
19.8	58.14 .54	19.6 2.4	0.67 .30	62.6 1.5	5.76 .34	45.9 2.5	59.77 .33	46.1 0.7
29.8	58.71 .60	17.5 1.8	0.98 .31	64.1 1.4	6.12 .37	43.6 2.0	60.11 .35	46.8 0.8
Feb. 8.8	59.33 .63	16.0 1.2	1.30 .32	65.4 1.3	6.50 .38	41.9 1.5	60.46 .35	47.6 0.8
18.8	59.96 .64	15.1 -0.5	1.61 .31	66.6 1.0	6.89 .39	40.7 0.9	60.81 .35	48.4 0.8
28.7	60.60 .63	15.0 +0.2	1.92 .30	67.5 0.8	7.27 .38	40.2 -0.2	61.16 .34	49.3 0.8
Mar. 10.7	61.22 .60	15.5 0.8	2.22 .29	68.1 0.5	7.65 .36	40.3 +0.4	61.50 .33	50.1 0.8
20.7	61.79 .55	16.6 1.4	2.50 .27	68.5 -0.2	8.00 .34	41.0 1.0	61.82 .31	50.9 0.7
30.7	62.31 .48	18.3 2.0	2.76 .25	68.6 0.0	8.33 .31	42.3 1.6	62.13 .29	51.6 0.7
Apr. 9.6	62.76 .41	20.6 2.5	3.00 .23	68.4 +0.3	8.62 .27	44.2 2.1	62.41 .27	52.2 0.6
19.6	63.13 .32	23.3 2.8	3.22 .20	68.0 0.5	8.87 .23	46.4 2.4	62.67 .25	52.8 0.5
29.6	63.40 .23	26.3 3.1	3.41 .18	67.4 0.7	9.08 .19	49.0 2.7	62.90 .22	53.4 0.5
May 9.5	63.58 .13	29.5 3.3	3.57 .15	66.7 0.8	9.25 .14	51.9 2.9	63.11 .19	53.8 0.5
19.5	63.67 +.04	32.8 3.3	3.71 .12	65.9 0.9	9.36 .09	54.9 3.0	63.28 .16	54.3 0.4
29.5	63.66 -.06	36.1 3.2	3.82 .09	64.9 0.9	9.43 +.04	58.0 3.0	63.43 .12	54.7 0.4
June 8.5	63.55 .15	39.2 3.1	3.89 .06	64.0 0.9	9.45 -.01	61.0 2.9	63.53 .09	55.0 0.3
18.4	63.35 .24	42.2 2.8	3.94 +.03	63.1 0.9	9.41 .06	63.8 2.8	63.60 .03	55.3 0.3
28.4	63.06 .32	44.0 2.5	3.95 -.01	62.2 0.9	9.33 .10	66.5 2.5	63.63 +.01	55.6 0.2
July 8.4	62.70 .40	47.2 2.1	3.92 .04	61.4 0.8	9.21 .15	68.9 2.2	63.62 -.03	55.8 0.2
18.4	62.27 .46	49.1 1.7	3.87 .07	60.6 0.7	9.04 .19	70.9 1.8	63.58 .06	55.9 -0.1
28.3	61.78 .51	50.6 1.2	3.78 .10	59.9 0.6	8.84 .22	72.5 1.4	63.49 .10	56.0 0.0
Aug. 7.3	61.24 .56	51.6 0.7	3.67 .12	59.3 0.5	8.60 .25	73.7 1.0	63.38 .13	55.9 +0.1
17.3	60.67 .58	52.1 +0.2	3.54 .14	58.8 0.4	8.34 .27	74.5 0.5	63.24 .15	55.8 0.2
27.2	60.08 .59	52.0 -0.3	3.39 .15	58.4 0.3	8.06 .28	74.8 +0.1	63.08 .17	55.6 0.3
Sept. 6.2	59.48 .59	51.4 0.8	3.23 .16	58.1 0.2	7.77 .29	74.6 -0.4	62.90 .17	55.2 0.4
16.2	58.90 .57	50.4 1.3	3.08 .15	58.0 +0.1	7.49 .28	73.9 0.9	62.73 .17	54.8 0.5
26.2	58.34 .54	48.8 1.8	2.93 .14	58.0 -0.1	7.21 .26	72.8 1.4	62.57 .15	54.2 0.6
Oct. 6.1	57.83 .48	46.7 2.3	2.81 .11	58.2 0.2	6.96 .23	71.2 1.8	62.42 .13	53.6 0.6
16.1	57.37 .42	44.2 2.7	2.71 .08	58.5 0.4	6.75 .19	69.2 2.2	62.31 .09	53.0 0.6
26.1	57.00 .33	41.3 3.1	2.65 -.04	59.0 0.6	6.58 .15	66.7 2.6	62.24 -.05	52.4 0.6
Nov. 5.0	56.71 .24	38.1 3.4	2.63 .00	59.7 0.8	6.46 .09	63.9 3.0	62.21 .00	51.9 0.5
15.0	56.52 .13	34.6 3.6	2.66 +.05	60.6 1.0	6.40 -.03	60.8 3.2	62.24 +.05	51.4 0.4
25.0	56.45 -.02	31.0 3.7	2.74 .10	61.7 1.2	6.40 +.04	57.5 3.4	62.32 .11	51.1 0.3
Dec. 5.0	56.49 +.10	27.2 3.7	2.86 .15	63.0 1.4	6.47 .10	54.0 3.5	62.45 .16	50.9 +0.1
14.9	56.64 .21	23.5 3.6	3.04 .20	64.4 1.5	6.60 .16	50.5 3.5	62.64 .21	50.9 -0.1
24.9	56.91 .32	19.9 3.4	3.26 .24	66.0 1.6	6.80 .23	47.1 3.4	62.87 .25	51.1 0.3
34.9	57.28 +.42	16.6 -3.1	3.51 +.26	67.6 -1.6	7.06 +.28	43.8 -3.1	63.15 +.29	51.4 -0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Draconis.		*A Draconis.		$\zeta$ Ophiuchi.		* $\alpha$ Trianguli Australis	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 16 <sup>m</sup> 22	<sup>°</sup> +61 <sup>'</sup> 46	<sup>h</sup> 16 <sup>m</sup> 28	<sup>°</sup> +69 <sup>'</sup> 1	<sup>h</sup> 16 <sup>m</sup> 30	<sup>°</sup> -10 <sup>'</sup> 19	<sup>h</sup> 16 <sup>m</sup> 35	<sup>°</sup> -68 <sup>'</sup> 48
(Dec. 30.9)	<sup>s</sup> 19.48 +.30	60.9 -3.4	<sup>s</sup> 10.75 +.33	30.3 -3.4	<sup>s</sup> 29.55 +.25	18.4 -1.2	<sup>s</sup> 50.36 +.56	7.4 +1.9
Jan. 9.9	19.82 .37	57.6 3.0	11.14 .43	27.0 3.1	29.81 .28	19.6 1.2	50.97 .66	5.7 1.5
19.8	20.23 .43	54.8 2.6	11.63 .52	24.2 2.6	30.10 .30	20.8 1.2	51.65 .71	4.5 1.1
29.8	20.68 .48	52.5 2.0	12.18 .59	21.8 2.1	30.41 .31	22.0 1.2	52.39 .76	3.6 0.7
Feb. 8.8	21.18 .51	50.7 1.4	12.80 .63	20.1 1.4	30.73 .32	23.2 1.1	53.16 .78	3.1 +0.2
18.8	21.69 .52	49.6 0.8	13.44 .65	19.0 0.8	31.05 .32	24.2 0.9	53.95 .79	3.1 -0.2
28.7	22.21 .52	49.2 -0.1	14.10 .65	18.5 -0.1	31.36 .31	25.0 0.7	54.74 .79	3.4 0.5
Mar. 10.7	22.72 .50	49.4 +0.6	14.75 .63	18.7 +0.6	31.67 .30	25.6 0.5	55.52 .77	4.2 0.9
20.7	23.20 .46	50.3 1.2	15.37 .60	19.6 1.2	31.97 .29	26.0 0.3	56.28 .74	5.3 1.3
30.7	23.64 .42	51.8 1.8	15.94 .54	21.2 1.8	32.25 .27	26.3 -0.1	56.99 .70	6.7 1.6
Apr. 9.6	24.04 .37	53.8 2.3	16.44 .46	23.2 2.3	32.51 .25	26.3 +0.1	57.66 .64	8.5 1.9
19.6	24.37 .30	56.4 2.7	16.86 .38	25.8 2.7	32.75 .23	26.1 0.2	58.28 .58	10.4 2.1
29.6	24.64 .23	59.2 3.0	17.20 .29	28.6 3.0	32.97 .21	25.8 0.4	58.82 .51	12.6 2.3
May 9.5	24.84 .16	62.3 3.2	17.44 .19	31.8 3.2	33.16 .18	25.4 0.5	59.30 .43	15.0 2.4
19.5	24.96 .08	65.6 3.3	17.58 +0.09	35.1 3.3	33.32 .15	24.9 0.5	59.68 .34	17.5 2.5
29.5	25.01 +0.01	68.9 3.3	17.61 -0.01	38.4 3.3	33.46 .12	24.3 0.6	59.98 .25	20.0 2.6
June 8.5	24.98 -0.06	72.1 3.2	17.55 .11	41.7 3.2	33.56 .08	23.7 0.6	60.19 .16	22.6 2.5
18.4	24.88 .14	75.2 3.0	17.39 .21	44.8 3.0	33.63 .05	23.1 0.6	60.30 +0.06	25.1 2.4
28.4	24.71 .20	78.1 2.7	17.13 .30	47.7 2.7	33.66 +0.01	22.5 0.6	60.30 -0.04	27.5 2.3
July 8.4	24.47 .27	80.6 2.3	16.78 .39	50.3 2.4	33.66 -0.02	21.9 0.6	60.21 .14	29.7 2.1
18.4	24.18 .32	82.7 1.9	16.36 .46	52.5 2.0	33.62 .06	21.4 0.5	60.02 .24	31.6 1.8
28.3	23.83 .37	84.5 1.5	15.87 .52	54.2 1.5	33.54 .09	20.9 0.5	59.74 .28	33.2 1.5
Aug. 7.3	23.43 .41	85.7 1.0	15.32 .57	55.5 1.0	33.44 .12	20.4 0.4	59.38 .30	34.5 1.1
17.3	23.01 .44	86.5 +0.5	14.73 .61	56.3 +0.5	33.31 .14	20.0 0.4	58.96 .45	35.4 0.6
27.2	22.56 .45	86.8 0.0	14.11 .63	56.6 0.0	33.17 .15	19.6 0.3	58.50 .48	35.8 -0.2
Sept. 6.2	22.10 .46	86.5 -0.5	13.48 .63	56.4 -0.5	33.01 .16	19.3 0.3	58.00 .50	35.7 +0.3
16.2	21.65 .45	85.7 1.0	12.85 .62	55.6 1.0	32.85 .16	19.1 0.2	57.51 .49	35.2 0.8
26.2	21.21 .42	84.4 1.5	12.24 .59	54.3 1.5	32.69 .15	18.9 +0.1	57.03 .46	34.1 1.2
Oct. 6.1	20.80 .39	82.7 2.0	11.67 .55	52.6 2.0	32.56 .13	18.8 0.0	56.60 .40	32.7 1.7
16.1	20.44 .34	80.4 2.5	11.15 .48	50.3 2.4	32.44 .09	18.9 -0.1	56.24 .38	30.8 2.0
26.1	20.13 .27	77.8 2.8	10.70 .40	47.7 2.8	32.37 .06	19.0 0.2	55.97 .32	28.6 2.3
Nov. 5.1	19.89 .20	74.7 3.2	10.35 .31	44.7 3.2	32.33 -0.01	19.3 0.4	55.80 -0.11	26.2 2.5
15.0	19.74 .11	71.4 3.4	10.09 .20	41.3 3.4	32.35 +0.04	19.7 0.5	55.76 +0.01	23.6 2.6
25.0	19.67 -0.02	67.9 3.6	9.95 -0.09	37.8 3.6	32.41 .09	20.4 0.7	55.84 .14	21.0 2.6
Dec. 5.0	19.70 +0.07	64.2 3.7	9.92 +0.03	34.1 3.7	32.52 .13	21.1 0.8	56.04 .27	18.4 2.5
14.9	19.81 .16	60.5 3.7	10.02 .15	30.4 3.7	32.68 .12	22.1 1.0	56.37 .30	16.0 2.3
24.9	20.02 .25	56.9 3.5	10.23 .27	26.8 3.5	32.89 .22	23.1 1.1	56.82 .50	13.7 2.1
34.9	20.31 +.32	53.5 -3.3	10.55 +.36	23.4 -3.3	33.13 +.25	24.3 -1.2	57.36 +.59	11.8 +1.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Herculis.		$\kappa$ Ophiuchi.		$\delta$ Herculis.		$\epsilon$ Ursæ Minoris.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 16 <sup>m</sup> 38	<sup>+</sup> 39° <sup>'</sup> 8	<sup>h</sup> 16 <sup>m</sup> 51	<sup>+</sup> 9° <sup>'</sup> 33	<sup>h</sup> 16 <sup>m</sup> 57	<sup>+</sup> 33° <sup>'</sup> 44	<sup>h</sup> 16 <sup>m</sup> 58	<sup>+</sup> 82° <sup>'</sup> 13
(Dec. 30.9)	44.03 +.23	59.3 -3.2	56.01 +.21	44.3 -2.1	7.37 +.20	29.5 -3.1	15.07 +.28	46.8 -3.5
Jan. 9.9	44.28 .27	56.2 2.9	56.24 .25	42.2 2.0	7.59 .24	26.5 2.9	15.70 .77	43.6 3.0
19.9	44.56 .30	53.4 2.6	56.50 .27	40.2 1.9	7.85 .28	23.8 2.6	16.61 1.04	40.7 2.6
29.8	44.88 .33	51.1 2.2	56.78 .29	38.4 1.7	8.15 .30	21.4 2.2	17.77 1.26	38.3 2.2
Feb. 8.8	45.22 .35	49.1 1.7	57.07 .30	36.9 1.4	8.46 .32	19.4 1.7	19.12 1.43	36.3 1.7
18.8	45.57 .35	47.8 1.1	57.38 .30	35.7 1.0	8.79 .33	18.0 1.2	20.62 1.55	34.9 1.1
28.8	45.92 .35	47.0 -0.5	57.68 .30	34.9 0.7	9.12 .33	17.0 0.6	22.21 1.60	34.1 -0.4
Mar. 10.7	46.27 .34	46.8 +0.1	57.98 .29	34.4 -0.2	9.46 .33	16.7 -0.1	23.82 1.60	34.1 +0.3
20.7	46.60 .32	47.2 0.7	58.27 .28	34.3 +0.1	9.78 .31	16.9 +0.5	25.39 1.54	34.7 0.9
30.7	46.92 .30	48.2 1.3	58.55 .27	34.7 0.5	10.08 .30	17.7 1.0	26.87 1.42	35.9 1.5
Apr. 9.6	47.20 .27	49.8 1.8	58.81 .25	35.4 0.9	10.37 .28	19.0 1.5	28.21 1.23	37.7 2.0
19.6	47.46 .24	51.7 2.2	59.05 .23	36.4 1.2	10.63 .25	20.8 2.0	29.35 1.04	40.0 2.5
29.6	47.69 .21	54.1 2.5	59.27 .21	37.7 1.4	10.87 .22	22.9 2.3	30.27 .80	42.7 2.8
May 9.6	47.87 .17	56.7 2.7	59.47 .18	39.2 1.6	11.07 .18	25.4 2.5	30.94 .53	45.6 3.1
19.5	48.02 .12	59.5 2.9	59.64 .15	40.8 1.7	11.24 .15	28.0 2.7	31.34 +.26	48.8 3.2
29.5	48.12 .08	62.4 2.9	59.77 .12	42.5 1.7	11.36 .11	30.8 2.8	31.45 -0.03	52.1 3.3
June 8.5	48.18 +.04	65.4 2.9	59.88 .09	44.3 1.7	11.45 .07	33.6 2.8	31.28 .31	55.4 3.2
18.5	48.19 -0.01	68.2 2.7	59.95 .05	46.0 1.7	11.50 +.02	36.3 2.7	30.63 .58	58.5 3.1
28.4	48.17 .05	70.8 2.5	59.98 +.01	47.7 1.6	11.50 -0.02	38.7 2.5	30.12 .83	61.5 2.9
July 8.4	48.09 .09	73.3 2.3	59.98 -0.02	49.2 1.5	11.46 .06	41.4 2.3	29.16 1.07	64.2 2.6
18.4	47.98 .13	75.4 2.0	59.94 .06	50.7 1.3	11.38 .10	43.6 2.0	27.99 1.26	66.6 2.2
28.3	47.82 .17	77.2 1.6	59.86 .09	51.9 1.1	11.25 .14	45.4 1.7	26.62 1.46	68.6 1.8
Aug 7.3	47.64 .20	78.6 1.2	59.76 .12	52.9 0.9	11.10 .17	47.0 1.4	25.08 1.60	70.2 1.2
17.3	47.43 .22	79.6 0.8	59.63 .14	53.7 0.7	10.92 .20	48.1 1.0	23.42 1.71	71.3 0.9
27.3	47.19 .24	80.2 +0.4	59.47 .16	54.3 0.4	10.71 .22	48.9 0.6	21.66 1.79	71.9 +0.4
Sept. 6.2	46.95 .25	80.4 -0.1	59.30 .17	54.6 +0.2	10.48 .23	49.3 +0.1	19.85 1.82	72.1 -0.1
16.2	46.69 .25	80.1 0.5	59.13 .17	54.7 0.0	10.25 .23	49.2 -0.3	18.02 1.82	71.7 0.6
26.2	46.45 .24	79.3 1.0	58.96 .16	54.5 -0.3	10.03 .22	48.7 0.7	16.22 1.77	70.8 1.1
Oct. 6.2	46.23 .21	78.1 1.4	58.80 .15	54.1 0.6	9.81 .21	47.8 1.1	14.49 1.68	69.5 1.6
16.1	46.03 .18	76.5 1.8	58.67 .12	53.4 0.8	9.62 .18	46.5 1.5	12.87 1.55	67.6 2.1
26.1	45.87 .14	74.4 2.2	58.56 .09	52.4 1.1	9.46 .14	44.8 1.9	11.41 1.37	65.4 2.5
Nov. 5.1	45.75 .09	72.0 2.6	58.49 -0.04	51.2 1.3	9.35 .09	42.6 2.3	10.13 1.16	62.7 2.8
15.0	45.68 -0.04	69.3 2.9	58.47 .00	49.7 1.6	9.28 -0.04	40.2 2.6	9.09 .91	59.7 3.1
25.0	45.68 +.02	66.3 3.1	58.50 +.05	48.1 1.8	9.26 +.01	37.5 2.8	8.32 .63	56.4 3.4
Dec. 5.0	45.73 .06	63.1 3.2	58.57 .10	46.2 1.9	9.30 .06	34.5 3.0	7.83 .33	53.0 3.5
15.0	45.84 .14	59.8 3.3	58.69 .14	44.2 2.0	9.39 .12	31.5 3.1	7.65 -0.02	49.5 3.5
24.9	46.01 .19	56.5 3.2	58.86 .19	42.1 2.1	9.54 .17	28.4 3.1	7.79 +.20	45.9 3.4
34.9	46.22 +.24	53.3 -3.1	59.06 +.22	40.0 -2.1	9.73 +.21	25.3 -3.0	8.24 +.59	42.6 -3.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha^1$ Herculis.		44 Ophiuchi.		$\beta$ Draconis.		$\alpha$ Ophiuchi.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 17	<sup>m</sup> 9	<sup>h</sup> 17	<sup>m</sup> 18	<sup>h</sup> 17	<sup>m</sup> 27	<sup>h</sup> 17	<sup>m</sup> 29
				<sup>s</sup> 24				<sup>s</sup> 36
(Dec. 30.9)	7.31 +.30	38.1 -2.3	58.48 +.33	45.8 -0.3	40.30 +.16	17.8 -3.5	18.51 +.18	50.7 -2.3
Jan. 9.9	7.52 .33	35.8 2.2	58.73 .36	46.0 0.3	40.40 .32	14.4 3.3	18.71 .31	48.6 2.1
19.9	7.77 .36	33.7 2.0	59.01 .39	46.3 0.3	40.66 .39	11.2 3.0	18.94 .34	46.5 2.0
29.9	8.04 .38	31.7 1.8	59.31 .31	46.7 0.4	40.98 .34	8.4 2.6	19.20 .37	44.6 1.8
Feb. 8.8	8.32 .39	30.1 1.5	59.03 .33	47.1 0.4	41.33 .37	6.1 2.1	19.47 .38	43.0 1.5
18.8	8.62 .39	28.8 1.1	59.96 .34	47.5 0.4	41.72 .40	4.3 1.5	19.76 .39	41.7 1.1
28.8	8.93 .39	27.9 0.7	60.30 .34	47.9 0.4	42.12 .41	3.1 0.9	20.06 .39	40.8 0.7
Mar. 10.7	9.23 .39	27.4 -0.3	60.64 .33	48.2 0.3	42.54 .41	2.5 -0.3	20.36 .39	40.3 -0.3
20.7	9.53 .39	27.4 +0.3	60.97 .33	48.5 0.3	42.95 .41	2.6 +0.4	20.66 .39	40.2 +0.1
30.7	9.81 .38	27.8 0.6	61.29 .38	48.7 0.3	43.35 .39	3.4 1.1	20.95 .39	40.6 0.5
Apr. 9.7	10.09 .36	26.6 1.0	61.60 .39	48.9 0.1	43.73 .36	4.7 1.6	21.23 .37	41.3 0.9
19.6	10.34 .34	29.8 1.3	61.90 .39	49.0 0.1	44.08 .33	6.6 2.1	21.50 .36	42.4 1.3
29.6	10.57 .32	31.3 1.6	62.18 .37	49.1 0.1	44.39 .39	9.0 2.6	21.74 .34	43.8 1.5
May 9.6	10.78 .19	33.0 1.8	62.43 .34	49.1 0.0	44.65 .34	11.8 2.9	21.97 .31	45.5 1.8
19.6	10.96 .17	34.9 2.0	62.65 .31	49.2 0.0	44.87 .19	14.8 3.2	22.17 .18	47.3 1.9
29.5	11.11 .13	36.9 2.0	62.85 .18	49.2 0.0	45.03 .13	18.1 3.3	22.34 .15	49.3 2.0
June 8.5	11.23 .10	39.0 2.1	63.01 .14	49.2 0.0	45.14 .08	21.4 3.3	22.47 .12	51.3 2.0
18.5	11.31 .06	41.0 2.0	63.14 .11	49.3 0.1	45.19 +.02	24.7 3.3	22.58 .08	53.3 2.0
28.4	11.35 +.02	43.0 1.9	63.22 .06	49.4 0.1	45.17 -.04	27.9 3.1	22.64 +.04	55.3 1.9
July 8.4	11.36 -.01	44.8 1.7	63.27 +.02	49.4 0.1	45.10 .10	30.9 2.9	22.67 .00	57.1 1.8
18.4	11.33 .05	46.5 1.6	63.26 -.02	49.5 0.1	44.97 .16	33.7 2.9	22.65 -.03	58.8 1.6
28.4	11.26 .09	47.9 1.3	63.22 .06	49.6 -0.1	44.78 .31	36.1 2.3	22.60 .07	60.2 1.4
Aug. 7.3	11.15 .12	49.2 1.1	63.14 .10	49.7 0.0	44.55 .28	38.2 1.9	22.51 .10	61.5 1.2
17.3	11.02 .15	50.1 0.8	63.02 .13	49.7 0.0	44.28 .39	39.8 1.4	22.39 .14	62.6 0.9
27.3	10.87 .17	50.9 0.6	62.88 .16	49.7 +0.1	43.97 .32	41.0 1.0	22.24 .16	63.4 0.6
Sept. 6.3	10.69 .18	51.3 +0.3	62.71 .17	49.6 0.1	43.63 .34	41.8 +0.5	22.08 .17	63.9 0.4
16.2	10.51 .16	51.4 0.0	62.54 .18	49.4 0.2	43.28 .35	42.0 0.0	21.90 .18	64.1 +0.1
26.2	10.33 .16	51.3 -0.3	62.36 .17	49.2 0.3	42.93 .36	41.7 -0.5	21.72 .18	64.1 -0.2
Oct. 6.2	10.16 .16	50.8 0.6	62.19 .16	48.8 0.3	42.50 .33	40.9 1.0	21.54 .17	63.7 0.5
16.1	10.01 .14	50.1 0.9	62.04 .13	48.5 0.4	42.27 .30	39.6 1.5	21.39 .15	63.1 0.8
26.1	9.89 .10	49.0 1.2	61.93 .10	48.1 0.4	41.98 .36	37.8 2.0	21.25 .19	62.2 1.0
Nov. 5.1	9.80 .07	47.6 1.5	61.85 .06	47.7 0.4	41.74 .31	35.5 2.4	21.15 .08	61.0 1.3
15.1	9.76 -.02	46.0 1.7	61.82 -.01	47.4 0.3	41.56 .15	32.9 2.8	21.10 -.03	59.6 1.6
25.0	9.76 +.03	44.2 2.0	61.84 +.05	47.1 0.2	41.44 .00	39.9 3.1	21.09 +.01	57.9 1.8
Dec. 5.0	9.81 .06	42.1 2.1	61.91 .10	46.9 +0.1	41.39 -.02	26.7 3.2	21.12 .08	56.0 2.0
15.0	9.91 .12	39.9 2.3	62.04 .15	46.8 0.0	41.41 +.05	23.2 3.5	21.20 .10	53.9 2.1
25.0	10.06 .17	37.6 2.3	62.21 .20	46.8 -0.1	41.50 .19	19.7 3.5	21.33 .15	51.8 2.2
34.9	10.25 +.21	35.3 -2.3	62.43 +.24	47.0 -0.2	41.66 +.19	16.3 -3.4	21.50 +.19	49.6 -2.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Draconis.		μ Herculis.		ψ¹ Draconis (pr.)		γ Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 17 37	<sup>°</sup> <sup>'</sup> +68 48	<sup>h</sup> <sup>m</sup> 17 41	<sup>°</sup> <sup>'</sup> +27 47	<sup>h</sup> <sup>m</sup> 17 43	<sup>°</sup> <sup>'</sup> +72 12	<sup>h</sup> <sup>m</sup> 17 53	<sup>°</sup> <sup>'</sup> +51 29
Jan. 0.0	<sup>s</sup> 36.04 +.16	<sup>"</sup> <sup>."</sup> 36.6 -3.6	<sup>s</sup> 42.59 +.15	<sup>"</sup> <sup>."</sup> 25.6 -2.8	<sup>s</sup> 60.99 +.14	<sup>"</sup> <sup>."</sup> 18.2 -3.6	<sup>s</sup> 46.21 +.19	<sup>"</sup> <sup>."</sup> 64.3 -3.5
9.9	36.26 .27	33.1 3.4	42.76 .20	22.8 2.7	61.20 .98	14.7 3.4	46.37 .19	60.9 3.3
19.9	36.58 .37	29.9 3.1	42.98 .23	20.1 2.5	61.54 .40	11.4 3.1	46.59 .25	57.6 3.1
29.9	37.00 .46	26.9 2.7	43.23 .26	17.7 2.2	62.01 .51	8.4 2.7	46.87 .30	54.7 2.7
Feb. 8.8	37.51 .54	24.5 2.2	43.51 .29	15.7 1.9	62.57 .61	5.9 2.3	47.19 .34	52.2 2.3
18.8	38.08 .59	22.6 1.6	43.80 .30	14.0 1.4	63.21 .68	3.9 1.7	47.55 .37	50.1 1.7
28.8	38.69 .63	21.3 1.0	44.11 .31	12.9 0.9	63.92 .73	2.5 1.0	47.93 .39	48.7 1.1
Mar. 10.8	39.33 .64	20.7 -0.3	44.42 .31	12.2 -0.4	64.66 .75	1.8 -0.4	48.34 .41	47.9 -0.5
20.7	39.98 .64	20.7 +0.4	44.74 .31	12.1 +0.2	65.41 .74	1.8 +0.3	48.74 .41	47.7 +0.2
30.7	40.60 .61	21.4 1.0	45.05 .30	12.6 0.7	66.14 .72	2.4 0.9	49.14 .40	48.2 0.8
Apr. 9.7	41.20 .57	22.8 1.6	45.34 .29	13.5 1.2	66.83 .67	3.7 1.6	49.53 .38	49.3 1.4
19.7	41.74 .51	24.7 2.2	45.63 .27	14.9 1.6	67.47 .60	5.5 2.1	49.90 .35	51.0 1.9
29.6	42.22 .44	27.1 2.6	45.89 .25	16.8 2.0	68.03 .52	7.9 2.6	50.23 .32	53.2 2.4
May 9.6	42.61 .35	30.0 3.0	46.13 .22	18.9 2.3	68.50 .42	10.7 2.9	50.53 .27	55.8 2.8
19.6	42.92 .26	33.1 3.2	46.33 .19	21.3 2.5	68.86 .31	13.7 3.2	50.78 .22	58.8 3.1
29.5	43.13 .16	36.4 3.4	46.51 .16	23.9 2.6	69.11 .19	17.0 3.4	50.98 .17	61.9 3.3
June 8.5	43.24 +.06	39.9 3.5	46.65 .12	26.6 2.7	69.24 +.07	20.4 3.4	51.12 .12	65.3 3.4
18.5	43.25 -0.4	43.3 3.4	46.75 .08	29.3 2.7	69.24 -0.5	23.9 3.4	51.21 +.06	68.6 3.4
28.5	43.16 .14	46.7 3.3	46.80 +.04	31.9 2.6	69.13 .18	27.2 3.3	51.24 .00	71.9 3.3
July 8.4	42.96 .24	49.9 3.0	46.82 -0.1	34.4 2.4	68.89 .29	20.4 3.1	51.20 -0.6	75.1 3.1
18.4	42.68 .33	52.8 2.8	46.79 .05	36.7 2.2	68.54 .40	33.4 2.8	51.11 .12	78.1 2.8
28.4	42.30 .42	55.4 2.4	46.72 .09	38.7 1.9	68.09 .50	36.1 2.5	50.97 .17	80.8 2.5
Aug. 7.4	41.84 .40	57.6 2.0	46.61 .13	40.5 1.6	67.54 .59	38.3 2.1	50.76 .22	83.1 2.1
17.3	41.32 .55	59.4 1.6	46.46 .16	41.9 1.3	66.92 .66	40.2 1.6	50.52 .27	85.0 1.7
27.3	40.74 .69	60.8 1.1	46.29 .19	43.0 0.9	66.22 .72	41.6 1.2	50.23 .30	86.6 1.3
Sept. 6.3	40.12 .63	61.6 0.6	46.00 .21	43.8 0.5	65.48 .76	42.5 0.7	49.91 .33	87.6 0.8
16.2	39.48 .65	62.0 +0.1	45.88 .22	44.1 +0.2	64.71 .78	42.9 +0.1	49.58 .34	88.2 +0.3
26.2	38.83 .64	61.8 -0.4	45.66 .21	44.1 -0.2	63.93 .78	42.8 -0.4	49.23 .34	88.3 -0.2
Oct. 6.2	38.20 .62	61.0 1.0	45.45 .20	43.6 0.6	63.16 .76	42.2 0.9	48.89 .32	87.8 0.7
16.2	37.59 .58	59.8 1.5	45.26 .18	42.8 1.0	62.42 .71	41.0 1.4	48.56 .31	86.9 1.2
26.1	37.03 .53	58.1 2.0	45.09 .15	41.5 1.4	61.74 .65	39.4 1.9	48.27 .28	85.4 1.7
Nov. 5.1	36.54 .45	55.8 2.4	44.95 .12	39.9 1.8	61.13 .57	37.2 2.4	48.01 .23	83.5 2.1
15.1	36.13 .36	53.2 2.8	44.86 .07	38.0 2.1	60.61 .47	34.6 2.8	47.80 .18	81.1 2.6
25.1	35.82 .26	50.2 3.2	44.81 -.02	35.7 2.4	60.20 .35	31.7 3.1	47.65 .12	78.4 2.9
Dec. 5.0	35.61 .15	46.9 3.4	44.81 +.03	33.2 2.6	59.91 .22	28.4 3.4	47.57 -.05	75.3 2.9
15.0	35.52 -.03	43.4 3.6	44.86 .08	30.5 2.8	59.76 -.06	25.0 3.5	47.55 +.02	72.0 3.4
25.0	35.55 +.09	39.8 3.6	44.96 .12	27.7 2.8	59.75 +.06	21.4 3.6	47.60 .09	68.6 3.5
34.9	35.69 +.21	36.3 -3.5	45.11 +.17	24.9 -2.8	59.88 +.19	17.8 -3.5	47.72 +.15	65.1 -3.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma^s$ Sagittarii.		$\mu^1$ Sagittarii.		$\eta$ Serpentis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 17 58	<sup>°</sup> <sup>'</sup> -30 25	<sup>h</sup> <sup>m</sup> 18 6	<sup>°</sup> <sup>'</sup> -21 5	<sup>h</sup> <sup>m</sup> 18 15	<sup>°</sup> <sup>'</sup> -2 55
Jan. 0.0	<sup>s</sup> 1.68 +.30	<sup>"</sup> 29.7 +0.4	<sup>s</sup> 31.20 +.18	<sup>"</sup> 23.8 -0.1	<sup>s</sup> 2.38 +.15	<sup>"</sup> 47.8 -1.2
9.9	1.90 .34	29.3 0.3	31.39 .31	23.9 0.2	2.55 .18	49.0 1.2
19.9	2.15 .37	29.0 0.3	31.62 .34	24.1 0.2	2.75 .21	50.2 1.2
29.9	2.44 .30	28.8 0.2	31.88 .37	24.3 0.2	2.98 .24	51.3 1.1
Feb. 8.9	2.75 .32	28.6 0.1	32.17 .39	24.5 0.2	3.23 .26	52.3 0.9
18.8	3.08 .34	28.5 0.1	32.47 .31	24.6 0.1	3.50 .28	53.1 0.7
28.8	3.43 .35	28.4 +0.1	32.78 .32	24.7 -0.1	3.78 .29	53.7 0.4
Mar. 10.8	3.78 .35	28.4 0.0	33.10 .32	24.7 0.0	4.07 .30	54.0 -0.2
20.7	4.13 .35	28.3 0.0	33.43 .32	24.7 +0.1	4.37 .30	54.0 +0.1
30.7	4.48 .35	28.3 0.0	33.75 .32	24.5 0.2	4.67 .30	53.8 0.4
Apr. 9.7	4.82 .34	28.3 0.0	34.07 .31	24.2 0.3	4.96 .29	53.3 0.6
19.7	5.15 .32	28.2 0.0	34.38 .30	23.9 0.3	5.25 .28	52.5 0.9
29.6	5.47 .31	28.3 0.0	34.68 .29	23.5 0.4	5.53 .27	51.5 1.0
May 9.6	5.77 .29	28.3 -0.1	34.96 .27	23.1 0.4	5.79 .25	50.4 1.2
19.6	6.04 .26	28.4 0.1	35.22 .25	22.7 0.4	6.03 .23	49.2 1.3
29.6	6.28 .23	28.6 0.2	35.46 .22	22.3 0.4	6.25 .20	47.9 1.3
June 8.5	6.50 .19	28.8 0.3	35.66 .19	22.0 0.3	6.44 .17	46.5 1.3
18.5	6.67 .15	29.2 0.3	35.83 .15	21.7 0.2	6.59 .14	45.2 1.3
28.5	6.80 .11	29.5 0.4	35.95 .11	21.5 0.2	6.71 .10	43.9 1.2
July 8.4	6.88 .08	29.9 0.4	36.04 .06	21.3 0.1	6.79 .08	42.7 1.1
18.4	6.91 +0.1	30.3 0.4	36.08 +0.02	21.3 0.1	6.82 +0.02	41.6 1.0
28.4	6.90 -0.4	30.8 0.4	36.08 -0.02	21.2 0.0	6.82 -0.02	40.7 0.9
Aug. 7.4	6.84 .08	31.2 0.4	36.03 .07	21.2 0.0	6.78 .06	39.8 0.7
17.3	6.74 .12	31.6 0.3	35.94 .10	21.2 0.0	6.69 .10	39.2 0.6
27.3	6.61 .15	31.9 0.2	35.82 .14	21.3 0.0	6.58 .13	38.6 0.4
Sept. 6.3	6.44 .17	32.1 -0.1	35.67 .16	21.3 0.0	6.44 .15	38.2 0.3
16.3	6.26 .19	32.1 0.0	35.51 .17	21.3 0.0	6.28 .16	38.0 +0.2
26.2	6.07 .19	32.0 +0.1	35.33 .18	21.2 0.1	6.11 .17	37.9 0.0
Oct. 6.2	5.88 .18	31.8 0.3	35.15 .17	21.1 0.1	5.94 .17	38.0 -0.1
16.2	5.70 .16	31.5 0.4	34.99 .15	21.0 0.1	5.78 .15	38.2 0.3
26.1	5.55 .13	31.1 0.5	34.85 .12	20.8 0.1	5.63 .12	38.5 0.4
Nov. 5.1	5.44 .09	30.5 0.6	34.74 .09	20.7 0.1	5.52 .10	39.0 0.6
15.1	5.37 -0.4	30.0 0.6	34.67 -0.05	20.5 0.1	5.44 .08	39.7 0.7
25.1	5.35 +0.1	29.3 0.6	34.65 .09	20.4 +0.1	5.41 -0.1	40.5 0.9
Dec. 5.0	5.39 .06	28.7 0.6	34.67 +0.05	20.3 0.0	5.41 +0.03	41.4 1.0
15.0	5.48 .11	28.1 0.5	34.74 .10	20.3 0.0	5.47 .07	42.4 1.1
25.0	5.62 .16	27.6 0.5	34.87 .15	20.3 -0.1	5.56 .12	43.6 1.2
35.0	5.81 +0.21	27.2 +0.4	35.03 +0.18	20.4 -0.1	5.70 +0.18	44.8 -1.2



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\sigma$ Octantis.		1 Aquilæ.		$\alpha$ Lyrae. (Vega.)	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 18	<sup>°</sup> -89 16'	<sup>h</sup> <sup>m</sup> 18 28	<sup>°</sup> -8 19'	<sup>h</sup> <sup>m</sup> 18 32	<sup>°</sup> +38 39'
Jan. 0.0	<sup>m</sup> <sup>s</sup> 21 24.2 + 5.7	<sup>"</sup> 34.6 +3.3	<sup>s</sup> 36.85 +.14	<sup>"</sup> 41.9 -0.8	<sup>s</sup> 49.29 +.09	<sup>"</sup> 73.9 -3.1
9.9	21 31.6 8.9	31.3 3.2	37.00 .18	42.8 0.8	49.41 .14	70.8 3.0
19.9	21 42.0 11.8	28.2 3.0	37.20 .21	43.6 0.8	49.57 .19	67.9 2.9
29.9	21 55.1 14.3	25.3 2.7	37.42 .24	44.4 0.7	49.78 .23	65.1 2.6
Feb. 8.9	22 10.6 16.5	22.8 2.3	37.67 .26	45.1 0.6	50.03 .26	62.6 2.3
18.8	22 27.9 18.2	20.7 1.9	37.94 .28	45.6 0.5	50.31 .29	60.5 1.9
28.8	22 46.8 19.4	19.0 1.4	38.22 .29	45.9 -0.3	50.61 .32	58.9 1.3
Mar. 10.8	23 6.6 20.2	17.9 0.9	38.51 .30	46.1 0.0	50.94 .33	57.9 0.7
20.7	23 27.0 20.5	17.1 +0.4	38.82 .30	46.0 +0.2	51.28 .34	57.5 -0.1
30.7	23 47.5 20.5	16.9 0.0	39.12 .30	45.7 0.4	51.62 .34	57.6 +0.4
Apr. 9.7	24 7.8 20.0	17.2 -0.5	39.42 .30	45.2 0.6	51.96 .34	58.4 1.0
19.7	24 27.4 19.1	18.0 1.0	39.72 .29	44.5 0.8	52.29 .33	59.7 1.6
29.6	24 45.8 17.8	19.2 1.4	40.01 .28	43.7 0.9	52.61 .31	61.5 2.0
May 9.6	25 2.8 16.2	20.8 1.8	40.28 .27	42.7 1.0	52.90 .28	63.7 2.4
19.6	25 18.0 14.2	22.8 2.2	40.54 .25	41.6 1.1	53.17 .25	66.3 2.7
29.6	25 31.0 11.9	25.2 2.5	40.77 .22	40.4 1.1	53.40 .21	69.2 3.0
June 8.5	25 41.6 9.3	27.8 2.7	40.98 .19	39.3 1.1	53.59 .17	72.2 3.1
18.5	25 49.6 6.5	30.6 2.9	41.15 .15	38.2 1.1	53.74 .13	75.4 3.2
28.5	25 54.6 3.6	33.5 3.0	41.29 .12	37.2 1.0	53.84 .08	78.5 3.1
July 8.4	25 56.6 + 0.5	36.5 3.0	41.38 .07	36.3 0.9	53.89 +.02	81.6 3.0
18.4	25 55.6 - 2.5	39.5 2.9	41.44 +.02	35.4 0.8	53.89 -.02	84.6 2.8
28.4	25 51.6 5.5	42.3 2.7	41.45 -.01	34.7 0.7	53.84 .07	87.3 2.6
Aug. 7.4	25 44.7 8.3	44.9 2.5	41.42 .05	34.1 0.5	53.74 .12	89.8 2.3
17.3	25 35.1 10.8	47.2 2.1	41.35 .00	33.6 0.4	53.60 .16	91.9 2.0
27.3	25 23.1 13.0	49.1 1.7	41.24 .12	33.2 0.3	53.42 .20	93.7 1.6
Sept. 6.3	25 9.3 14.7	50.5 1.2	41.11 .15	33.0 0.2	53.21 .23	95.1 1.2
16.3	24 53.9 15.8	51.5 -0.6	40.95 .16	32.8 +0.1	52.97 .25	96.0 0.7
26.2	24 37.8 16.4	51.8 0.0	40.79 .17	32.7 0.0	52.71 .28	96.6 +0.3
Oct. 6.2	24 21.4 16.3	51.5 +0.6	40.62 .17	32.7 -0.1	52.46 .25	96.6 -0.2
16.2	24 5.5 15.5	50.7 1.1	40.46 .15	32.9 0.2	52.21 .24	96.2 0.6
26.2	23 50.6 14.1	49.2 1.7	40.31 .13	33.1 0.3	51.98 .22	95.3 1.1
Nov. 5.1	23 37.5 12.1	47.2 2.2	40.19 .10	33.4 0.4	51.77 .19	94.0 1.6
15.1	23 26.7 9.5	44.8 2.7	40.11 .06	33.8 0.4	51.60 .15	92.2 2.0
25.1	23 18.6 6.6	41.9 3.0	40.07 -.02	34.3 0.5	51.48 .10	90.1 2.3
Dec. 5.0	23 13.6 - 3.3	38.8 3.3	40.07 +.02	34.9 0.6	51.40 -.05	87.6 2.6
15.0	23 11.9 0.0	35.4 3.4	40.11 .06	35.6 0.7	51.38 .00	84.8 2.9
25.0	23 13.7 + 3.5	31.9 3.4	40.19 .11	36.4 0.8	51.40 +.06	81.8 3.0
35.0	23 18.8 + 6.7	28.5 +3.3	40.33 +.15	37.2 -0.9	51.49 +.11	78.8 -3.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Lyræ.		$\sigma$ Sagittarii.		*50 Draconis.		$\zeta$ Aquilæ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 18 45	<sup>m</sup> +33 13	<sup>h</sup> 18 47	<sup>m</sup> -26 26	<sup>h</sup> 18 50	<sup>m</sup> +75 17	<sup>h</sup> 18 59	<sup>m</sup> +13 40
Jan. 0.0	<sup>s</sup> 35.71 +.08	<sup>"</sup> 19.2 -2.9	<sup>s</sup> 45.31 +.14	<sup>"</sup> 46.8 +0.4	<sup>s</sup> 9.86 -1.0	<sup>"</sup> 21.5 -3.4	<sup>s</sup> 50.90 +.09	<sup>"</sup> 62.4 -2.0
10.0	35.81 .13	16.3 2.9	45.47 .18	46.5 0.4	9.85 +.07	18.1 3.4	50.31 .13	60.4 2.0
19.9	35.96 .17	13.5 2.7	45.67 .21	46.1 0.3	10.00 .23	14.7 3.4	50.45 .16	58.4 2.0
29.9	36.15 .21	10.8 2.5	45.90 .25	45.8 0.3	10.31 .39	11.4 3.1	50.63 .19	56.6 1.7
Feb. 8.9	36.38 .24	8.5 2.2	46.16 .27	45.4 0.4	10.78 .53	8.4 2.8	50.84 .22	55.0 1.5
18.9	36.64 .27	6.5 1.8	46.44 .30	45.1 0.4	11.37 .66	5.8 2.3	51.07 .25	53.6 1.2
28.8	36.92 .29	4.9 1.3	46.75 .31	44.7 0.4	12.08 .76	3.8 1.8	51.33 .27	52.6 0.8
Mar. 10.8	37.23 .31	3.9 0.8	47.07 .33	44.3 0.4	12.88 .83	2.2 1.2	51.60 .28	51.9 -0.4
20.8	37.55 .32	3.4 -0.2	47.40 .33	43.8 0.5	13.73 .87	1.4 -0.5	51.89 .29	51.7 0.0
30.8	37.87 .33	3.5 +0.4	47.73 .34	43.3 0.5	14.61 .89	1.1 +0.1	52.18 .30	51.9 +0.4
Apr. 9.7	38.19 .32	4.1 0.9	48.07 .34	42.8 0.5	15.49 .87	1.6 0.8	52.48 .30	52.5 0.8
19.7	38.52 .32	5.3 1.4	48.40 .33	42.3 0.5	16.34 .83	2.7 1.4	52.78 .30	53.5 1.2
29.7	38.83 .30	7.0 1.9	48.73 .32	41.7 0.5	17.14 .76	4.3 1.9	53.07 .29	54.9 1.5
May 9.6	39.12 .28	9.1 2.3	49.05 .31	41.2 0.5	17.85 .67	6.5 2.4	53.36 .27	56.6 1.8
19.6	39.39 .25	11.5 2.6	49.35 .29	40.8 0.4	18.47 .56	9.2 2.8	53.62 .25	58.5 2.0
29.6	39.62 .22	14.2 2.8	49.63 .26	40.4 0.3	18.96 .43	12.2 3.1	53.86 .23	60.6 2.2
June 8.6	39.83 .18	17.1 3.0	49.87 .23	40.2 0.2	19.33 .29	15.4 3.4	54.08 .20	62.9 2.3
18.5	39.99 .14	20.1 3.0	50.09 .19	40.0 +0.1	19.55 +.15	18.9 3.5	54.26 .17	65.1 2.3
28.5	40.11 .10	23.1 3.0	50.26 .15	40.0 0.0	19.63 .00	22.4 3.5	54.41 .13	67.4 2.2
July 8.5	40.18 +.05	26.1 2.9	50.39 .11	40.0 -0.1	19.55 -1.5	25.9 3.5	54.52 .09	69.6 2.2
18.5	40.21 .00	28.9 2.7	50.47 .06	40.2 0.2	19.34 .29	29.3 3.3	54.58 +.04	71.7 2.0
28.4	40.19 -.05	31.5 2.5	50.51 +.01	40.4 0.3	18.98 .43	32.6 3.1	54.60 .00	73.6 1.8
Aug. 7.4	40.12 .00	33.9 2.3	50.50 -.04	40.7 0.3	18.49 .55	35.6 2.8	54.58 -.04	75.4 1.6
17.4	40.00 .13	36.0 1.9	50.44 .08	41.1 0.3	17.88 .67	38.3 2.5	54.51 .08	76.9 1.4
27.4	39.85 .17	37.8 1.6	50.34 .12	41.4 0.3	17.16 .76	40.6 2.1	54.41 .12	78.1 1.1
Sept. 6.3	39.67 .20	39.2 1.2	50.20 .15	41.7 0.3	16.35 .84	42.5 1.7	54.28 .15	79.1 0.9
16.3	39.45 .22	40.2 0.8	50.04 .17	41.9 0.2	15.48 .90	44.0 1.2	54.12 .17	79.8 0.6
26.3	39.23 .23	40.8 +0.4	49.86 .18	42.1 -0.1	14.56 .94	45.0 0.7	53.95 .17	80.3 +0.3
Oct. 6.2	38.99 .23	41.0 -0.1	49.68 .18	42.2 0.0	13.61 .95	45.4 +0.2	53.76 .16	80.4 0.0
16.2	38.77 .22	40.7 0.5	49.50 .17	42.2 +0.1	12.67 .94	45.3 -0.3	53.59 .17	80.3 -0.3
26.2	38.55 .20	40.0 0.9	49.33 .15	42.1 0.2	11.75 .90	44.7 0.9	53.42 .16	79.8 0.6
Nov. 5.2	38.37 .17	38.8 1.3	49.19 .12	41.8 0.2	10.88 .84	43.5 1.4	53.27 .13	79.1 0.9
15.1	38.21 .14	37.3 1.7	49.09 .08	41.6 0.3	10.09 .75	41.9 1.9	53.15 .10	78.0 1.2
25.1	38.09 .10	35.3 2.1	49.03 -.04	41.2 0.3	9.39 .63	39.7 2.4	53.07 .07	76.7 1.4
Dec. 5.1	38.02 -.05	33.1 2.4	49.01 +.01	40.9 0.4	8.82 .50	37.1 2.8	53.02 -.03	75.2 1.6
15.0	37.99 .00	30.5 2.6	49.05 .06	40.5 0.4	8.39 .36	34.2 3.1	53.02 +.02	73.5 1.8
25.0	38.02 +.05	27.8 2.8	49.13 .11	40.1 0.4	8.11 .20	30.9 3.3	53.06 .06	71.6 1.9
35.0	38.09 +.10	24.9 -2.9	49.26 +.15	39.7 +0.4	7.99 -.03	27.6 -3.4	53.14 +.11	69.6 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Sagittarii.		* $\delta$ Draconis.		* $\gamma$ Draconis.		$\delta$ Aquilæ.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 19 <sup>m</sup> 10	<sup>°</sup> -19 <sup>'</sup> 9	<sup>h</sup> 19 <sup>m</sup> 12	<sup>°</sup> +67 <sup>'</sup> 26	<sup>h</sup> 19 <sup>m</sup> 17	<sup>°</sup> +73 <sup>'</sup> 7	<sup>h</sup> 19 <sup>m</sup> 19	<sup>°</sup> +2 <sup>'</sup> 52
Jan. 0.0	32.87 +.10	61.4 0.0	27.66 -.07	54.2 -3.4	47.01 -.16	48.9 -3.3	23.29 +.08	26.7 -1.3
10.0	32.99 .14	61.4 0.0	27.64 +.03	50.7 3.4	46.92 -.01	45.5 3.4	23.39 .19	25.4 1.3
20.0	33.16 .18	61.4 0.0	27.73 .14	47.3 3.4	46.98 +.13	42.1 3.4	23.53 .15	24.1 1.3
29.9	33.36 .21	61.4 +0.1	27.93 .24	44.0 3.2	47.18 .27	38.8 3.2	23.70 .18	22.8 1.1
Feb. 8.9	33.58 .24	61.3 0.1	28.22 .34	40.9 2.9	47.52 .40	35.7 3.0	23.89 .21	21.8 1.0
18.9	33.84 .28	61.1 0.2	28.61 .49	38.2 2.5	47.98 .52	32.9 2.6	24.12 .23	20.9 0.7
28.9	34.11 .28	60.8 0.3	29.07 .49	35.9 2.0	48.55 .62	30.5 2.1	24.36 .25	20.3 0.5
Mar. 10.8	34.40 .30	60.5 0.4	29.59 .55	34.2 1.4	49.21 .69	28.7 1.5	24.62 .27	20.0 -0.2
20.8	34.71 .31	60.0 0.5	30.16 .59	33.1 0.8	49.93 .75	27.5 0.9	24.90 .28	20.0 +0.2
30.8	35.02 .32	59.4 0.6	30.76 .61	32.6 -0.1	50.70 .78	27.0 -0.2	25.19 .29	20.3 0.5
Apr. 9.7	35.34 .32	58.7 0.7	31.38 .61	32.8 +0.5	51.48 .78	27.1 +0.4	25.49 .30	21.0 0.8
19.7	35.66 .32	57.9 0.8	31.98 .59	33.7 1.2	52.26 .76	27.8 1.1	25.79 .30	21.9 1.1
29.7	35.98 .32	57.0 0.9	32.56 .56	35.1 1.8	53.00 .72	29.2 1.6	26.08 .29	23.2 1.3
May 9.7	36.29 .31	56.1 0.9	33.10 .51	37.2 2.3	53.69 .65	31.1 2.2	26.38 .28	24.6 1.6
19.6	36.58 .29	55.3 0.9	33.58 .45	39.7 2.7	54.30 .57	33.5 2.6	26.65 .27	26.3 1.7
29.6	36.86 .27	54.4 0.8	34.06 .38	42.6 3.1	54.82 .47	36.4 3.0	26.91 .25	28.0 1.8
June 8.6	37.12 .24	53.7 0.7	34.33 .29	45.8 3.3	55.24 .36	39.5 3.2	27.15 .22	29.8 1.8
18.6	37.34 .20	53.0 0.6	34.57 .20	49.3 3.5	55.54 .24	42.9 3.5	27.36 .19	31.7 1.8
28.5	37.52 .16	52.4 0.5	34.72 +.10	52.8 3.6	55.71 +.10	46.5 3.6	27.53 .15	33.5 1.8
July 8.5	37.66 .12	52.0 0.4	34.77 .00	56.4 3.6	55.75 -.02	50.1 3.6	27.66 .11	35.2 1.7
18.5	37.76 .08	51.6 0.3	34.73 -.10	60.0 3.5	55.66 .15	53.6 3.5	27.75 .07	36.8 1.5
28.5	37.82 +.03	51.4 +0.1	34.58 .19	63.4 3.3	55.45 .28	57.1 3.3	27.80 +.03	38.3 1.4
Aug. 7.4	37.83 -.01	51.3 0.0	34.34 .28	66.6 3.1	55.11 .40	60.3 3.1	27.80 -.02	39.6 1.2
17.4	37.79 .06	51.3 0.0	34.01 .37	69.5 2.8	54.66 .50	63.3 2.8	27.77 .06	40.7 1.0
27.4	37.71 .10	51.4 -0.1	33.61 .44	72.1 2.4	54.11 .60	66.0 2.5	27.69 .09	41.6 0.8
Sept. 6.3	37.50 .12	51.5 0.1	33.14 .50	74.3 2.0	53.47 .68	68.3 2.1	27.58 .12	42.3 0.6
16.3	37.45 .15	51.7 0.1	32.61 .55	76.1 1.5	52.76 .74	70.1 1.6	27.44 .15	42.8 0.4
26.3	37.29 .17	51.8 0.1	32.04 .58	77.4 1.0	52.00 .78	71.5 1.1	27.29 .16	43.1 +0.2
Oct. 6.3	37.12 .17	52.0 0.1	31.45 .60	78.1 +0.5	51.20 .81	72.4 0.6	27.12 .17	43.2 0.0
16.2	36.94 .17	52.1 0.1	30.86 .59	78.3 0.0	50.39 .81	72.7 +0.1	26.96 .16	43.1 -0.2
26.2	36.78 .15	52.2 -0.1	30.27 .57	78.0 -0.6	49.58 .79	72.6 -0.5	26.80 .15	42.8 0.4
Nov. 5.2	36.64 .13	52.2 0.0	29.71 .54	77.1 1.1	48.81 .75	71.8 1.0	26.65 .13	42.3 0.6
15.2	36.53 .09	52.3 0.0	29.20 .48	75.7 1.7	48.10 .68	70.5 1.6	26.54 .10	41.6 0.8
25.1	36.46 .05	52.3 0.0	28.75 .41	73.8 2.2	47.45 .60	68.7 2.1	26.46 .06	40.8 0.9
Dec. 5.1	36.42 -.01	52.3 0.0	28.38 .33	71.4 2.6	46.91 .49	66.4 2.5	26.41 -.03	39.7 1.1
15.1	36.44 +.03	52.3 0.0	28.09 .24	68.6 3.0	46.47 .37	63.7 2.9	26.40 +.01	38.6 1.2
25.0	36.49 .08	52.3 0.0	27.90 .14	65.5 3.2	46.16 .24	60.7 3.2	26.44 .06	37.3 1.3
35.0	36.50 +.12	52.3 0.0	27.81 -.03	62.1 -3.4	45.99 -.10	57.4 -3.3	26.51 +.09	36.0 -1.3



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Aquilæ.		$\tau$ Aquilæ.		$\alpha$ Capricorni.		$\pi$ Cephei.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 19 <sup>m</sup> 49	<sup>°</sup> +6 <sup>'</sup> 6	<sup>h</sup> 19 <sup>m</sup> 58	<sup>°</sup> +6 <sup>'</sup> 56	<sup>h</sup> 20 <sup>m</sup> 11	<sup>°</sup> -12 <sup>'</sup> 54	<sup>h</sup> 20 <sup>m</sup> 12	<sup>°</sup> +77 <sup>'</sup> 20
Jan. 0.1	21.66 +.05	19.0 -1.4	13.27 +.04	14.6 -1.4	20.08 +.04	70.4 -0.3	49.03 -.46	52.0 -2.9
10.0	21.73 .08	17.6 1.4	13.32 .08	13.1 1.4	20.14 .08	70.6 0.2	48.65 .36	48.9 3.2
20.0	21.83 .12	16.2 1.4	13.42 .11	11.7 1.4	20.23 .11	70.8 0.2	48.47 -.08	45.7 3.3
30.0	21.97 .15	14.8 1.3	13.55 .14	10.4 1.3	20.36 .14	71.0 -0.1	48.47 +.10	42.4 3.3
Feb. 8.9	22.14 .18	13.6 1.1	13.70 .17	9.2 1.1	20.52 .17	71.0 0.0	48.66 .36	39.1 3.2
18.9	22.33 .21	12.6 0.9	13.89 .20	8.2 0.9	20.71 .20	70.9 +0.2	49.03 .46	36.0 2.9
28.9	22.56 .23	11.9 0.6	14.11 .23	7.4 0.6	20.93 .23	70.6 0.3	49.58 .63	33.3 2.6
Mar. 10.9	22.80 .25	11.5 -0.3	14.34 .25	7.0 -0.3	21.17 .25	70.2 0.5	50.28 .77	30.9 2.1
20.8	23.06 .27	11.4 +0.1	14.60 .27	6.9 +0.1	21.43 .27	69.5 0.7	51.10 .88	29.0 1.6
30.8	23.34 .28	11.6 0.4	14.88 .28	7.1 0.4	21.71 .28	68.7 0.9	52.02 .96	27.8 1.0
Apr. 9.8	23.63 .30	12.3 0.8	15.17 .29	7.7 0.8	22.01 .30	67.7 1.1	53.01 1.01	27.1 -0.3
19.8	23.93 .30	13.2 1.1	15.46 .30	8.7 1.1	22.31 .31	66.6 1.2	54.03 1.02	27.1 +0.3
29.7	24.23 .30	14.5 1.4	15.77 .30	9.9 1.4	22.63 .32	65.3 1.3	55.04 1.00	27.7 0.9
May 9.7	24.53 .30	16.0 1.6	16.07 .30	11.5 1.7	22.94 .31	64.0 1.4	56.02 .95	29.0 1.5
19.7	24.82 .28	17.7 1.8	16.36 .29	13.2 1.9	23.25 .31	62.6 1.4	56.94 .86	30.8 2.1
29.6	25.10 .27	19.6 1.9	16.64 .27	15.2 2.0	23.55 .29	61.2 1.4	57.77 .78	33.1 2.5
June 8.6	25.35 .24	21.6 2.0	16.90 .25	17.2 2.1	23.84 .27	59.9 1.3	58.47 .64	35.8 2.9
18.6	25.58 .21	23.6 2.0	17.13 .22	19.3 2.1	24.10 .24	58.6 1.2	59.05 .50	38.9 3.2
28.6	25.78 .18	25.7 2.0	17.34 .18	21.4 2.1	24.33 .21	57.4 1.1	59.47 .34	42.2 3.5
July 8.5	25.93 .14	27.6 1.9	17.50 .14	23.4 2.0	24.52 .17	56.4 0.9	59.73 .18	45.8 3.6
18.5	26.05 .09	29.5 1.8	17.63 .10	25.4 1.9	24.67 .13	55.5 0.8	59.83 +0.1	49.4 3.7
28.5	26.12 .05	31.2 1.6	17.71 .06	27.2 1.7	24.78 .08	54.9 0.6	59.75 -.16	53.1 3.6
Aug. 7.5	26.15 +.01	32.7 1.4	17.74 +.01	28.8 1.5	24.84 +.04	54.3 0.4	59.51 .39	56.7 3.5
17.4	26.14 -.04	34.0 1.2	17.74 -.03	30.2 1.3	24.85 -.01	54.0 0.3	59.12 .47	60.1 3.3
27.4	26.08 .07	35.1 1.0	17.69 .07	31.4 1.1	24.82 .05	53.8 +0.1	58.57 .62	63.3 3.1
Sept. 6.4	25.99 .11	36.0 0.8	17.60 .10	32.3 0.8	24.75 .09	53.7 0.0	57.89 .74	66.3 2.8
16.3	25.86 .14	36.7 0.5	17.48 .13	33.1 0.6	24.65 .12	53.7 -0.1	57.09 .85	68.9 2.4
26.3	25.72 .16	37.1 0.3	17.34 .15	33.6 0.4	24.52 .14	53.8 0.2	56.19 .94	71.1 2.0
Oct. 6.3	25.56 .16	37.3 +0.1	17.18 .16	33.9 +0.2	24.37 .16	54.0 0.2	55.21 1.01	72.9 1.5
16.3	25.39 .16	37.3 -0.1	17.02 .16	33.9 -0.1	24.21 .16	54.3 0.3	54.18 1.05	74.1 1.0
26.2	25.23 .16	37.1 0.3	16.85 .16	33.7 0.3	24.05 .15	54.6 0.3	53.12 1.08	74.8 +0.4
Nov. 5.2	25.08 .14	36.7 0.6	16.70 .14	33.3 0.5	23.90 .14	54.9 0.3	52.07 1.05	75.0 -0.1
15.2	24.95 .12	36.0 0.8	16.57 .12	33.6 0.7	23.77 .12	55.2 0.3	51.04 1.00	74.6 0.7
25.2	24.85 .09	35.1 1.0	16.47 .09	31.8 0.9	23.66 .09	55.5 0.3	50.07 .93	73.6 1.2
Dec. 5.1	24.78 .05	34.1 1.1	16.39 .06	30.8 1.1	23.59 .06	55.8 0.3	49.19 .83	72.1 1.8
15.1	24.75 -.02	32.8 1.3	16.35 -.02	29.6 1.3	23.55 -.02	56.1 0.3	48.42 .71	70.1 2.3
25.1	24.75 +.02	31.5 1.4	16.35 +.01	28.2 1.4	23.54 +.02	56.4 0.3	47.78 .56	67.6 2.7
35.0	24.79 +.06	30.1 -1.4	16.38 +.05	26.8 -1.4	23.58 +.05	56.7 -0.3	47.31 -.39	64.7 -3.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Pavonis		$\pi$ Capricorni.		$\epsilon$ Delphini.		*Groombridge 3241.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 20 16	<sup>m</sup> -57° 6'	<sup>h</sup> 20 20	<sup>m</sup> -18° 36'	<sup>h</sup> 20 27	<sup>m</sup> +10° 53'	<sup>h</sup> 20 30	<sup>m</sup> +72° 7'
Jan. 0.1	3.69 +.02	81.9 +2.2	23.38 +.04	29.3 +0.1	25.44 +.01	35.5 -1.5	26.48 -.34	26.7 -2.8
10.0	3.75 .09	79.6 2.4	23.43 .07	29.2 0.1	25.47 .04	34.0 1.5	26.20 .21	23.7 3.1
20.0	3.87 .16	77.1 2.5	23.52 .11	29.0 0.2	25.53 .06	32.5 1.5	26.05 -.08	20.5 3.3
30.0	4.06 .22	74.6 2.5	23.65 .14	28.8 0.3	25.63 .11	31.0 1.4	26.03 +.05	17.2 3.3
Feb. 9.0	4.31 .26	72.1 2.5	23.81 .17	28.4 0.4	25.75 .14	29.6 1.3	26.15 .18	13.9 3.2
18.9	4.62 .33	69.7 2.4	23.99 .20	28.0 0.5	25.91 .17	28.4 1.1	26.39 .21	10.8 3.0
28.9	4.97 .36	67.4 2.3	24.21 .23	27.3 0.7	26.10 .20	27.5 0.8	26.76 .22	7.9 2.7
Mar. 10.9	5.37 .42	65.2 2.1	24.45 .25	26.6 0.8	26.32 .23	26.0 0.4	27.24 .23	5.4 2.2
20.9	5.81 .46	63.1 1.9	24.71 .27	25.7 0.9	26.56 .25	26.6 -0.1	27.81 .22	3.4 1.7
30.8	6.28 .48	61.3 1.7	24.99 .29	24.7 1.1	26.82 .27	26.7 +0.3	28.46 .22	2.0 1.1
Apr. 9.8	6.78 .50	59.7 1.4	25.29 .31	23.6 1.2	27.10 .29	27.2 0.7	29.17 .73	1.2 -0.5
19.8	7.29 .52	58.4 1.1	25.60 .32	22.4 1.2	27.39 .30	28.1 1.1	29.91 .75	1.0 +0.1
29.7	7.81 .52	57.4 0.8	25.93 .32	21.1 1.3	27.70 .31	29.3 1.4	30.67 .75	1.5 0.8
May 9.7	8.33 .52	56.8 0.5	26.25 .32	19.8 1.3	28.01 .31	30.9 1.7	31.41 .73	2 6 1.4
19.7	8.85 .50	56.4 +0.1	26.57 .32	18.5 1.3	28.31 .29	32.7 1.9	32.19 .68	4.3 1.9
29.7	9.34 .48	56.5 -0.2	26.89 .30	17.2 1.2	28.60 .29	34.7 2.1	32.77 .62	6.5 2.4
June 8.6	9.80 .44	56.9 0.6	27.18 .28	16.0 1.1	28.88 .27	36.9 2.2	33.35 .54	9.1 2.2
18.6	10.23 .40	57.6 0.9	27.46 .26	14.9 1.0	29.13 .24	39.2 2.3	33.84 .44	12.1 2.2
28.6	10.60 .34	58.6 1.2	27.70 .23	14.0 0.8	29.36 .21	41.5 2.3	34.22 .32	15.5 2.4
July 8.6	10.91 .28	60.0 1.4	27.91 .19	13.3 0.6	29.55 .17	43.7 2.2	34.50 .22	19.0 2.6
18.5	11.15 .20	61.5 1.7	28.07 .14	12.7 0.5	29.70 .13	45.9 2.1	34.66 +.10	22.7 2.7
28.5	11.31 .12	63.3 1.8	28.19 .10	12.4 0.3	29.80 .08	48.0 2.0	34.70 -.02	26.4 2.7
Aug. 7.5	11.40 +.05	65.2 1.9	28.26 +.05	12.1 +0.1	29.86 +.04	49.9 1.8	34.61 .14	30.1 2.6
17.4	11.41 -.03	67.1 1.9	28.29 .00	12.1 0.0	29.88 -.01	51.6 1.6	34.41 .26	33.6 2.5
27.4	11.34 .11	69.0 1.9	28.26 -.04	12.2 -0.1	29.85 .05	53.1 1.4	34.10 .26	37.0 2.2
Sept. 6.4	11.19 .18	70.8 1.7	28.30 .06	12.4 0.2	29.78 .09	54.3 1.1	33.68 .25	40.1 2.9
16.4	10.99 .23	72.5 1.5	28.10 .12	12.7 0.3	29.68 .12	55.3 0.8	33.18 .55	42.9 2.6
26.3	10.73 .28	73.9 1.2	27.97 .14	13.0 0.3	29.55 .14	56.0 0.6	32.59 .62	45.2 2.2
Oct. 6.3	10.43 .31	74.9 0.9	27.82 .16	13.4 0.3	29.41 .15	56.5 0.3	31.94 .67	47.2 1.7
16.3	10.12 .28	75.6 0.5	27.66 .16	13.7 0.3	29.25 .16	56.7 +0.1	31.26 .70	48.7 1.2
26.3	9.79 .22	75.9 -0.1	27.50 .16	14.1 0.3	29.09 .16	56.6 -0.2	30.54 .72	49.6 0.6
Nov. 5.2	9.48 .20	75.8 +0.3	27.34 .15	14.4 0.3	28.93 .15	56.3 0.4	29.82 .72	50.0 +0.1
15.2	9.20 .26	75.2 0.8	27.20 .13	14.6 0.2	28.79 .13	55.7 0.2	29.11 .69	49.7 -0.5
25.2	8.96 .22	74.2 1.2	27.09 .10	14.8 0.2	28.67 .11	54.9 0.0	28.44 .65	49.0 1.1
Dec. 5.1	8.76 .16	72.9 1.5	27.01 .07	14.9 -0.1	28.57 .08	53.9 1.1	27.83 .58	47.6 1.6
15.1	8.64 .10	71.2 1.9	26.96 -.03	15.0 0.0	28.51 .05	52.7 1.2	27.28 .50	45.7 2.1
25.1	8.57 -.03	69.2 2.1	26.95 +.01	15.0 0.0	28.48 -.01	51.3 1.4	26.83 .40	43.4 2.6
35.1	8.58 +.05	67.0 +2.2	26.98 +.04	14.9 +0.1	28.48 +.02	49.8 -1.5	26.48 -.22	40.6 -2.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Cygni.		$\mu$ Aquarii.		$\nu$ Cygni.		*12 Year Cat. 1879.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 20 37	<sup>°</sup> <sup>'</sup> +44 50	<sup>h</sup> <sup>m</sup> 20 46	<sup>°</sup> <sup>'</sup> -9 25	<sup>h</sup> <sup>m</sup> 20 52	<sup>°</sup> <sup>'</sup> +40 41	<sup>h</sup> <sup>m</sup> 20 52	<sup>°</sup> <sup>'</sup> +80 5
Jan. 0.1	<sup>s</sup> 17.13 - .07	61.1 - 2.6	<sup>s</sup> 7.33 + .01	72.0 - 0.4	<sup>s</sup> 38.68 - .07	75.5 - 2.4	<sup>s</sup> 52.99 - .79	61.7 - 2.5
10.1	17.08 - .02	58.4 2.8	7.35 .04	72.4 0.4	38.63 - .03	72.9 2.6	52.30 .58	59.0 2.9
20.0	17.09 + .03	55.5 2.9	7.41 .07	72.8 0.3	38.62 + .02	70.3 2.7	51.83 .36	56.0 3.1
30.0	17.14 .06	52.6 2.9	7.50 .11	73.0 0.2	38.66 .06	67.5 2.7	51.59 - .12	52.8 3.2
Feb. 9.0	17.24 .13	49.7 2.8	7.63 .14	73.2 - 0.1	38.75 .11	64.8 2.6	51.60 + .13	49.6 3.2
19.0	17.40 .18	47.1 2.5	7.78 .17	73.1 + 0.1	38.88 .15	62.3 2.4	51.85 .37	46.4 3.1
28.9	17.60 .22	44.7 2.2	7.96 .19	73.0 0.3	39.06 .20	60.0 2.1	52.33 .59	43.4 2.9
Mar. 10.9	17.85 .27	42.7 1.7	8.17 .22	72.6 0.5	39.28 .24	58.1 1.7	53.03 .80	40.7 2.5
20.9	18.13 .30	41.2 1.2	8.40 .25	71.9 0.7	39.54 .28	56.7 1.2	53.92 .97	38.4 2.0
30.8	18.45 .33	40.3 0.7	8.66 .27	71.1 0.9	39.83 .31	55.7 0.7	54.96 1.11	36.7 1.5
Apr. 9.8	18.79 .36	39.9 - 0.1	8.94 .29	70.1 1.1	40.15 .33	55.3 - 0.1	56.13 1.21	35.5 0.9
19.8	19.16 .37	40.1 + 0.5	9.23 .30	68.8 1.3	40.50 .36	55.5 + 0.4	57.38 1.27	34.9 - 0.3
29.8	19.54 .38	40.9 1.1	9.54 .31	67.5 1.4	40.85 .38	56.2 1.0	58.66 1.29	34.9 + 0.4
May 9.7	19.92 .38	42.2 1.6	9.85 .31	66.0 1.6	41.22 .38	57.5 1.5	59.93 1.26	35.6 1.0
19.7	20.29 .38	44.1 2.1	10.16 .31	64.4 1.6	41.58 .38	59.2 2.0	61.16 1.19	36.9 1.5
29.7	20.64 .34	46.4 2.5	10.47 .30	62.7 1.6	41.93 .34	61.4 2.4	62.31 1.09	38.7 2.1
June 8.7	20.97 .31	49.1 2.9	10.77 .29	61.1 1.6	42.26 .31	64.0 2.7	63.33 0.96	41.0 2.5
18.6	21.27 .27	52.1 3.1	11.05 .26	59.5 1.5	42.56 .28	66.9 3.0	64.21 0.80	43.8 2.9
28.6	21.52 .23	55.3 3.3	11.30 .23	58.1 1.4	42.82 .24	70.0 3.2	64.92 0.62	46.9 3.2
July 8.6	21.72 .18	58.7 3.4	11.51 .20	56.7 1.2	43.04 .19	73.2 3.3	65.44 0.42	50.3 3.5
18.5	21.88 .12	62.1 3.4	11.69 .16	55.6 1.1	43.20 .14	76.6 3.3	65.77 0.22	53.8 3.6
28.5	21.97 .07	65.5 3.4	11.83 .11	54.6 0.9	43.32 .09	79.9 3.3	65.88 + 0.1	57.5 3.7
Aug. 7.5	22.01 + .01	68.9 3.2	11.92 .07	53.8 0.7	43.38 + .04	83.1 3.2	65.79 - .20	61.2 3.7
17.5	21.99 - .06	72.0 3.0	11.96 + .02	53.2 0.5	43.39 - .02	86.2 3.0	65.49 0.40	64.9 3.6
27.4	21.91 .10	74.9 2.8	11.96 - .02	52.8 0.3	43.35 .07	89.1 2.7	64.99 0.56	68.4 3.4
Sept. 6.4	21.79 .15	77.6 2.5	11.92 .06	52.5 + 0.2	43.26 .12	91.7 2.5	64.31 0.77	71.7 3.2
16.4	21.62 .19	79.9 2.1	11.84 .09	52.4 0.0	43.12 .15	94.0 2.1	63.47 0.22	74.8 2.9
26.4	21.41 .22	81.8 1.7	11.74 .12	52.4 - 0.1	42.95 .19	95.9 1.7	62.47 1.06	77.5 2.5
Oct. 6.3	21.18 .24	83.3 1.3	11.60 .14	52.6 0.2	42.75 .21	97.4 1.3	61.35 1.17	79.8 2.1
16.3	20.93 .26	84.4 0.8	11.46 .15	52.8 0.3	42.53 .23	98.5 0.9	60.13 1.26	81.7 1.6
26.3	20.67 .28	84.9 + 0.3	11.31 .15	53.2 0.3	42.30 .23	99.2 + 0.4	58.85 1.31	83.1 1.1
Nov. 5.3	20.41 .25	85.0 - 0.2	11.16 .14	53.5 0.4	42.07 .23	99.4 - 0.1	57.53 1.23	84.0 + 0.6
15.2	20.17 .24	84.6 0.7	11.02 .13	53.9 0.4	41.85 .21	99.1 0.5	56.20 1.29	84.2 0.6
25.2	19.94 .21	83.6 1.2	10.91 .10	54.4 0.5	41.64 .20	98.3 1.0	54.90 1.27	83.9 - 0.6
Dec. 5.2	19.74 .18	82.2 1.6	10.81 .08	54.8 0.5	41.46 .17	97.1 1.5	53.68 1.18	83.0 1.2
15.1	19.57 .14	80.4 2.1	10.75 .06	55.3 0.5	41.31 .14	95.4 1.9	52.56 1.05	81.6 1.7
25.1	19.45 .10	78.1 2.4	10.72 - .01	55.7 0.4	41.20 .10	93.3 2.2	51.58 0.90	79.6 2.2
35.1	19.37 - .05	75.5 - 2.7	10.72 + .02	56.2 - 0.4	41.11 - .06	91.0 - 2.5	50.78 - .71	77.1 - 2.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	61 Cygni ( <i>pr.</i> )		ζ Cygni.		α Cephei.		γ Pegasi.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 21	<sup>m</sup> 1	<sup>h</sup> 21	<sup>m</sup> 7	<sup>h</sup> 21	<sup>m</sup> 15	<sup>h</sup> 21	<sup>m</sup> 16
Jan. 0.1	27.57 -06	26.3 -2.2	46.53 -06	59.2 -2.0	39.16 -24	34.0 -2.4	29.10 -04	21.1 -1.6
10.1	27.53 -02	24.0 2.4	46.50 -02	57.1 2.2	38.96 .17	31.4 2.8	29.08 -01	19.4 1.7
20.1	27.53 +02	21.5 2.5	46.50 +02	54.8 2.3	38.82 .10	28.5 2.0	29.09 +02	17.6 1.8
30.0	27.58 .07	19.0 2.5	46.54 .06	52.5 2.3	38.77 -02	25.4 3.1	29.13 .06	15.8 1.8
Feb. 9.0	27.66 .11	16.4 2.4	46.61 .09	50.3 2.2	38.79 +06	22.2 3.1	29.20 .09	14.1 1.7
19.0	27.79 .15	14.1 2.2	46.73 .13	48.2 2.0	38.89 .15	19.1 3.0	29.31 .13	12.5 1.5
29.9	27.97 .20	12.0 1.9	46.88 .17	46.3 1.7	39.08 .23	16.2 2.8	29.45 .16	11.2 1.2
Mar. 10.9	28.18 .24	10.2 1.5	47.07 .21	44.8 1.4	39.34 .30	13.6 2.4	29.63 .19	10.1 0.9
20.9	28.44 .27	8.9 1.1	47.30 .24	43.7 0.9	39.68 .37	11.4 2.0	29.84 .22	9.4 0.5
30.9	28.73 .30	8.1 -0.6	47.55 .27	43.0 -0.4	40.08 .43	9.7 1.4	30.07 .25	9.1 -0.1
Apr. 9.8	29.05 .33	7.8 0.0	47.83 .30	42.8 +0.1	40.53 .48	8.5 0.8	30.34 .28	9.3 +0.2
19.8	29.39 .35	8.0 +0.5	48.14 .32	43.1 0.6	41.03 .51	8.0 -0.2	30.63 .30	9.8 0.8
29.8	29.74 .36	8.8 1.0	48.46 .33	43.9 1.0	41.55 .53	8.1 +0.4	30.93 .31	10.8 1.2
May 9.8	30.11 .37	10.1 1.6	48.80 .33	45.2 1.5	42.08 .53	8.8 1.0	31.24 .32	12.2 1.6
19.7	30.47 .38	11.9 2.0	49.13 .33	46.9 1.9	42.61 .52	10.1 1.6	31.56 .32	13.9 1.9
29.7	30.83 .35	14.1 2.4	49.46 .32	49.1 2.3	43.12 .50	11.9 2.1	31.88 .31	16.0 2.2
June 8.7	31.16 .32	16.7 2.8	49.77 .30	51.5 2.6	43.60 .46	14.3 2.6	32.19 .30	18.2 2.4
18.6	31.48 .29	19.6 3.0	50.07 .28	54.2 2.8	44.03 .41	17.0 2.9	32.47 .28	20.7 2.5
28.6	31.75 .26	22.8 3.2	50.33 .24	57.0 2.9	44.41 .35	20.1 3.3	32.74 .24	23.3 2.6
July 8.6	31.99 .21	26.0 3.3	50.55 .20	59.9 3.0	44.73 .28	23.5 3.5	32.96 .21	25.9 2.6
18.6	32.18 .16	29.4 3.3	50.74 .16	62.9 3.0	44.97 .20	27.1 3.6	33.15 .17	28.5 2.6
28.5	32.32 .11	32.7 3.3	50.87 .11	65.9 2.9	45.13 .12	30.8 3.7	33.30 .13	31.0 2.5
Aug. 7.5	32.40 .06	36.0 3.2	50.96 .07	68.7 2.8	45.21 +04	34.5 3.7	33.41 .08	33.5 2.3
17.5	32.44 +01	39.1 3.0	51.01 +02	71.5 2.6	45.21 -04	38.2 3.6	33.47 +04	35.7 2.2
27.5	32.42 -04	42.0 2.8	51.00 -03	74.0 2.4	45.13 .12	41.7 3.4	33.48 -01	37.8 1.9
Sept. 6.4	32.35 .09	44.6 2.5	50.95 .07	76.2 2.1	44.97 .19	45.0 2.2	33.45 .06	39.6 1.7
16.4	32.25 .13	47.0 2.2	50.86 .11	78.2 1.8	44.75 .25	48.1 2.9	33.39 .09	41.1 1.4
26.4	32.10 .16	49.0 1.8	50.73 .14	79.9 1.5	44.47 .31	50.8 2.5	33.28 .11	42.4 1.1
Oct. 6.3	31.93 .18	50.6 1.4	50.58 .16	81.2 1.1	44.14 .35	53.1 2.1	33.16 .14	43.4 0.8
16.3	31.74 .20	51.8 1.0	50.40 .18	82.1 0.7	43.77 .39	55.0 1.6	33.01 .15	44.0 0.5
26.3	31.53 .21	52.6 0.5	50.22 .18	82.6 +0.3	43.37 .41	56.4 1.1	32.86 .16	44.4 +0.2
Nov. 5.3	31.33 .20	52.9 +0.1	50.04 .18	82.8 -0.1	42.95 .42	57.3 +0.6	32.70 .16	44.4 -0.1
15.2	31.13 .19	52.8 -0.4	49.86 .17	82.5 0.5	42.53 .41	57.6 0.0	32.54 .15	44.1 0.4
25.2	30.94 .18	52.2 0.8	49.60 .16	81.8 0.9	42.13 .40	57.3 -0.6	32.40 .13	43.5 0.8
Dec. 5.2	30.77 .15	51.1 1.3	49.55 .13	80.8 1.2	41.74 .37	56.4 1.1	32.22 .11	42.5 1.1
15.2	30.64 .12	49.6 1.7	49.43 .11	79.4 1.6	41.40 .33	55.0 1.7	32.18 .09	41.3 1.3
25.1	30.53 .09	47.8 2.0	49.34 .08	77.6 1.9	41.09 .27	53.1 2.1	32.10 .06	39.9 1.5
35.1	30.46 -05	45.6 -2.3	49.28 -04	75.6 -2.1	40.85 -21	50.7 -2.6	32.06 -03	38.3 -1.6



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Aquarii.		$\alpha$ Cephei.		$\zeta$ Aquarii.		$\epsilon$ Pegasi.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 21 <sup>m</sup> 25	<sup>°</sup> -6 <sup>'</sup> 5	<sup>h</sup> 21 <sup>m</sup> 27	<sup>°</sup> +70 <sup>'</sup> 1	<sup>h</sup> 21 <sup>m</sup> 31	<sup>°</sup> -8 <sup>'</sup> 23	<sup>h</sup> 21 <sup>m</sup> 38	<sup>°</sup> +9 <sup>'</sup> 19
Jan. 0.1	11.22 <sup>s</sup> -.02	69.5 <sup>"</sup> -0.6	2.15 <sup>s</sup> -.39	59.4 <sup>"</sup> -2.3	18.50 <sup>s</sup> -.03	46.5 <sup>"</sup> -0.4	14.44 <sup>s</sup> -.05	19.2 <sup>"</sup> -1.2
10.1	11.21+.01	70.0 0.5	1.80 .31	57.0 2.6	18.49 .00	46.9 0.4	14.41-.02	18.0 1.2
20.1	11.23 .03	70.5 0.4	1.54 .21	54.2 3.0	18.50+.03	47.2 0.3	14.41+.01	16.7 1.2
30.0	11.28 .06	70.9 0.3	1.39-.09	51.1 3.2	18.55 .06	47.4 -0.2	14.44 .04	15.5 1.2
Feb. 9.0	11.36 .09	71.1 -0.2	1.35+.02	47.9 3.2	18.62 .09	47.5 0.0	14.49 .07	14.4 1.1
19.0	11.47 .12	71.2 0.0	1.43 .14	44.7 3.2	18.73 .12	47.5 +0.2	14.58 .11	13.4 0.9
Mar. 1.0	11.61 .15	71.1 +0.2	1.62 .25	41.6 3.0	18.87 .15	47.2 0.4	14.71 .14	12.6 0.7
10.9	11.78 .18	70.8 0.4	1.93 .36	38.8 2.6	19.03 .18	46.8 0.6	14.96 .17	12.0 0.4
20.9	11.98 .21	70.3 0.7	2.34 .46	36.4 2.2	19.23 .21	46.1 0.8	15.05 .20	11.8 -0.1
30.9	12.21 .24	69.5 0.9	2.84 .54	34.4 1.7	19.45 .24	45.2 1.0	15.26 .23	11.9 +0.3
Apr. 9.9	12.46 .26	68.4 1.1	3.42 .61	33.0 1.1	19.70 .26	44.1 1.2	15.51 .26	12.4 0.6
19.8	12.74 .29	67.2 1.4	4.06 .68	32.1 -0.5	19.98 .28	42.7 1.4	15.78 .28	13.2 1.0
29.8	13.03 .30	65.7 1.5	4.73 .69	31.9 +0.1	20.27 .30	41.2 1.6	16.06 .30	14.3 1.2
May 9.8	13.34 .31	64.1 1.7	5.43 .70	32.3 0.7	20.58 .31	39.6 1.7	16.37 .31	15.7 1.6
19.7	13.66 .31	62.4 1.8	6.12 .68	33.3 1.3	20.89 .32	37.8 1.8	16.68 .31	17.5 1.8
29.7	13.97 .31	60.6 1.8	6.79 .65	35.0 1.9	21.21 .31	36.0 1.8	16.99 .31	19.4 2.0
June 8.7	14.28 .30	58.7 1.8	7.42 .60	37.1 2.4	21.52 .31	34.2 1.8	17.30 .30	21.5 2.2
18.7	14.57 .28	56.9 1.8	7.99 .54	39.7 2.8	21.82 .29	32.5 1.7	17.60 .29	23.7 2.3
28.6	14.84 .26	55.2 1.7	8.49 .46	42.6 3.1	22.10 .26	30.8 1.6	17.87 .26	26.0 2.3
July 8.6	15.09 .23	53.6 1.5	8.90 .36	45.9 3.4	22.35 .23	29.3 1.4	18.12 .23	28.3 2.2
18.6	15.30 .19	52.1 1.4	9.22 .26	49.5 3.6	22.56 .20	27.9 1.3	18.33 .19	30.5 2.2
28.5	15.47 .15	50.8 1.2	9.43 .16	53.2 3.7	22.74 .16	26.7 1.1	18.50 .15	32.6 2.0
Aug. 7.5	15.59 .10	49.7 1.0	9.54+.05	56.9 3.8	22.87 .11	25.8 0.8	18.63 .11	34.6 1.9
17.5	15.67 .06	48.9 0.8	9.53-.05	60.7 3.7	22.96 .00	25.0 0.6	18.72 .06	36.3 1.7
27.5	15.71+.01	48.2 0.6	9.43 .16	64.4 3.6	23.00+.02	24.5 0.4	18.76+.02	37.9 1.5
Sept. 6.4	15.70-.03	47.7 0.4	9.22 .25	67.9 3.4	23.00-.02	24.2 0.2	18.76-.02	39.2 1.2
16.4	15.65 .06	47.5 +0.2	8.92 .34	71.2 3.1	22.96 .06	24.0 +0.1	18.72 .06	40.3 1.0
26.4	15.58 .09	47.4 0.0	8.54 .42	74.1 2.8	22.89 .09	24.0 -0.1	18.65 .09	41.2 0.7
Oct. 6.4	15.47 .12	47.4 -0.1	8.08 .49	76.8 2.4	22.78 .11	24.2 0.2	18.55 .11	41.8 0.5
16.3	15.34 .13	47.6 0.2	7.57 .54	78.9 1.9	22.66 .13	24.5 0.3	18.43 .13	42.2 +0.2
26.3	15.20 .14	47.9 0.3	7.01 .58	80.6 1.4	22.53 .14	24.8 0.4	18.29 .14	42.3 0.0
Nov. 5.3	15.06 .14	48.3 0.4	6.42 .60	81.8 0.9	22.39 .14	25.2 0.4	18.15 .14	42.2 -0.2
15.2	14.93 .13	48.8 0.5	5.82 .60	82.4 +0.3	22.25 .13	25.7 0.5	18.01 .14	41.9 0.4
25.2	14.81 .11	49.3 0.5	5.23 .59	82.5 -0.3	22.13 .12	26.2 0.5	17.88 .12	41.4 0.6
Dec. 5.2	14.70 .10	49.8 0.6	4.65 .56	81.0 0.9	22.02 .10	26.7 0.5	17.77 .11	40.6 0.8
15.2	14.62 .07	50.4 0.6	4.12 .51	80.7 1.4	21.93 .07	27.2 0.5	17.67 .08	39.7 1.0
25.1	14.56 .04	51.0 0.6	3.65 .44	79.0 2.0	21.87 .05	27.7 0.5	17.60 .06	38.7 1.1
35.1	14.53-.02	51.5 -0.6	3.24-.36	76.8 -2.4	21.83-.02	28.2 -0.4	17.55-.04	37.5 -1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*11 Cephei.		μ Capricorni.		*79 Draconis.		α Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 21 40	+70° 45'	<sup>h</sup> <sup>m</sup> 21 46	-14° 6'	<sup>h</sup> <sup>m</sup> 21 51	+73° 7'	<sup>h</sup> <sup>m</sup> 21 59	-0° 54'
Jan. 0.1	5.32 - .43	30.3 -2.1	41.94 - .04	74.9 -0.2	17.90 - .53	63.6 -1.9	34.13 - .06	23.8 -0.7
10.1	4.93 .35	28.0 2.5	41.91 - .01	75.0 -0.1	17.31 .44	61.4 2.4	34.10 - .08	24.5 0.7
20.1	4.63 .25	25.2 2.9	41.91 + .02	75.0 +0.1	16.93 .33	58.8 2.8	34.09 .00	25.2 0.6
30.1	4.43 .14	22.2 3.1	41.95 .05	74.9 0.9	16.66 .20	55.8 3.0	34.10 + .03	25.8 0.6
Feb. 9.0	4.35 - .02	19.1 3.2	42.01 .08	74.6 0.4	16.52 - .07	52.7 3.2	34.14 .06	26.3 0.4
19.0	4.40 + .10	15.9 3.2	42.10 .11	74.2 0.5	16.52 + .07	49.5 3.2	34.22 .00	26.7 -0.3
Mar. 1.0	4.56 .22	12.8 3.0	42.22 .14	73.6 0.7	16.66 .21	46.4 3.1	34.32 .12	26.8 0.0
10.9	4.84 .34	9.9 2.7	42.38 .17	72.7 0.9	16.94 .34	43.4 2.8	34.45 .15	26.7 +0.2
20.9	5.24 .45	7.4 2.3	42.57 .20	71.7 1.1	17.35 .47	40.8 2.4	34.62 .18	26.4 0.4
30.9	5.73 .54	5.3 1.8	42.78 .23	70.5 1.3	17.87 .56	38.6 2.0	34.82 .21	25.8 0.7
Apr. 9.9	6.31 .61	3.7 1.3	43.03 .26	69.1 1.5	18.49 .67	36.8 1.5	35.05 .24	25.0 1.0
19.8	6.95 .67	2.7 0.7	43.30 .28	67.6 1.6	19.20 .74	35.7 0.9	35.30 .27	23.8 1.3
29.8	7.64 .71	2.3 -0.1	43.59 .30	65.9 1.7	19.97 .79	35.1 -0.3	35.58 .29	22.5 1.5
May 9.8	8.36 .72	2.6 +0.5	43.90 .31	64.2 1.8	20.76 .81	35.1 +0.3	35.88 .30	20.9 1.7
19.8	9.08 .72	3.4 1.1	44.22 .32	62.4 1.8	21.57 .81	35.8 0.9	36.19 .31	19.1 1.8
29.7	9.79 .69	4.9 1.7	44.54 .32	60.6 1.8	22.37 .78	37.0 1.5	36.50 .32	17.2 2.0
June 8.7	10.45 .64	6.8 2.2	44.86 .32	58.8 1.7	23.13 .73	38.8 2.1	36.82 .31	15.2 2.0
18.7	11.07 .58	9.3 2.7	45.18 .30	57.2 1.6	23.83 .67	41.2 2.5	37.12 .30	13.2 2.0
28.6	11.61 .50	12.2 3.0	45.47 .28	55.6 1.4	24.46 .58	43.9 2.9	37.41 .28	11.2 1.9
July 8.6	12.06 .41	15.4 2.3	45.73 .25	54.3 1.2	24.99 .48	47.0 3.3	37.67 .25	9.3 1.8
18.6	12.49 .31	18.8 2.6	45.97 .21	53.2 1.0	24.42 .37	50.4 3.5	37.90 .21	7.5 1.7
28.6	12.68 .20	22.5 3.7	46.16 .17	52.3 0.8	25.73 .25	54.0 3.7	38.10 .17	5.9 1.5
Aug. 7.5	12.83 + .02	26.3 3.8	46.31 .13	51.6 0.5	25.92 .13	57.7 3.8	38.25 .13	4.4 1.3
17.5	12.86 - .02	30.1 3.8	46.42 .08	51.2 0.3	25.99 + .01	61.5 3.8	38.36 .00	3.2 1.1
27.5	12.79 .12	33.8 2.7	46.48 + .04	51.0 +0.1	25.94 - .11	65.3 3.7	38.43 + .05	2.2 0.9
Sept. 6.5	12.62 .22	37.4 3.5	46.49 .00	51.0 -0.1	25.78 .23	69.0 3.6	38.45 .00	1.4 0.7
16.4	12.34 .32	40.8 3.2	46.46 - .04	51.1 0.2	25.50 .33	72.5 3.4	38.44 - .02	0.8 0.5
26.4	11.98 .40	43.9 2.9	46.40 .08	51.4 0.4	25.11 .43	75.7 3.1	38.39 .07	0.5 0.3
Oct. 6.4	11.54 .47	46.7 2.6	46.31 .10	51.9 0.5	24.64 .52	78.6 2.7	38.31 .00	0.3 +0.1
16.3	11.04 .53	49.0 2.1	46.19 .12	52.4 0.5	24.08 .59	81.2 2.3	38.20 .11	0.3 -0.1
26.3	10.48 .58	50.9 1.6	46.06 .13	52.9 0.6	23.46 .64	83.3 1.8	38.09 .12	0.5 0.2
Nov. 5.3	9.89 .61	52.3 1.1	45.92 .14	53.5 0.6	22.80 .68	84.8 1.3	37.92 .13	0.8 0.4
15.3	9.27 .62	53.1 +0.5	45.79 .13	54.0 0.5	22.10 .70	85.8 0.7	37.82 .13	1.2 0.5
25.2	8.66 .61	53.3 -0.1	45.66 .12	54.5 0.5	21.40 .70	86.3 +0.1	37.70 .12	1.7 0.6
Dec. 5.2	8.06 .58	52.9 0.7	45.54 .11	55.0 0.4	20.70 .68	86.1 -0.5	37.59 .11	2.3 0.6
15.2	7.50 .54	52.0 1.2	45.45 .08	55.4 0.3	20.04 .64	85.3 1.0	37.49 .00	3.0 0.7
25.2	6.98 .48	50.4 1.8	45.38 .06	55.6 0.2	19.43 .58	84.0 1.6	37.41 .07	3.7 0.7
35.1	6.54 - .40	48.4 -2.3	45.33 - .03	55.8 -0.1	18.89 - .50	82.1 -2.2	37.35 - .04	4.4 -0.7



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*226 Cephei (B.)		ζ Pegasi		*4 Cephei.		λ Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 22 <sup>m</sup> 30	<sup>°</sup> +75 <sup>'</sup> 36	<sup>h</sup> 22 <sup>m</sup> 35	<sup>°</sup> +10 <sup>'</sup> 12	<sup>h</sup> 22 <sup>m</sup> 45	<sup>°</sup> +65 <sup>'</sup> 33	<sup>h</sup> 22 <sup>m</sup> 46	<sup>°</sup> -8 <sup>'</sup> 12
Jan. 0.2	4.95 -79	29.8 -1.4	25.67 -0.08	7.1 -1.0	20.87 -39	70.4 -1.3	18.30 -0.08	81.9 -0.4
10.1	4.27 .62	28.1 2.0	25.60 .06	6.0 1.1	20.50 .34	68.8 1.9	18.23 .06	82.3 0.3
20.1	3.71 .51	25.9 2.4	25.55 .04	4.9 1.1	20.19 .98	66.7 2.3	18.19 .04	82.6 0.2
30.1	3.26 .38	23.3 2.8	25.53 -.01	3.8 1.1	19.94 .91	64.2 2.7	18.16 -.01	82.8 -0.1
Feb. 9.1	2.96 .23	20.4 3.0	25.53 +.09	2.8 1.0	19.76 .13	61.4 2.9	18.16 +.01	82.8 +0.1
19.0	2.80 -.07	17.3 3.1	25.56 .05	1.8 0.9	19.67 -.04	58.4 3.0	18.19 .04	82.6 0.2
Mar. 1.0	2.81 +.09	14.2 3.1	25.63 .08	1.0 0.7	19.67 +.05	55.4 3.0	18.25 .07	82.3 0.4
11.0	2.98 .25	11.1 3.0	25.72 .11	0.5 0.4	19.77 .15	52.4 2.9	18.34 .11	81.7 0.7
20.9	3.31 .41	8.2 2.7	25.86 .15	0.2 -0.1	19.97 .94	49.7 2.6	18.46 .14	80.9 0.8
30.9	3.80 .55	5.7 2.4	26.03 .18	0.2 +0.2	20.25 .33	47.2 2.3	18.62 .17	79.9 1.1
Apr. 9.9	4.42 .68	3.5 1.9	26.23 .22	0.5 0.5	20.62 .41	45.2 1.8	18.81 .21	78.7 1.3
19.9	5.15 .79	1.9 1.4	26.46 .25	1.2 0.8	21.07 .48	43.6 1.3	19.04 .24	77.2 1.5
29.8	5.96 .86	0.8 0.8	26.73 .28	2.2 1.2	21.59 .54	42.6 0.7	19.29 .27	75.6 1.7
May 9.8	6.87 .92	0.3 -0.2	27.01 .30	3.5 1.5	22.15 .58	42.1 -0.2	19.57 .29	73.8 1.9
19.8	7.80 .94	0.4 +0.4	27.32 .31	5.1 1.7	22.74 .60	42.3 +0.4	19.87 .31	71.8 2.0
29.8	8.74 .93	1.1 1.0	27.64 .32	6.9 1.9	23.35 .61	43.0 1.0	20.18 .22	69.8 2.0
June 8.7	9.66 .90	2.3 1.6	27.96 .32	8.9 2.1	23.95 .60	44.3 1.6	20.50 .22	67.8 2.0
18.7	10.54 .85	4.2 2.1	28.27 .31	11.2 2.2	24.54 .57	46.1 2.1	20.82 .22	65.8 1.9
28.7	11.35 .77	6.5 2.5	28.57 .29	13.3 2.3	25.09 .53	48.4 2.5	21.13 .20	63.9 1.8
July 8.6	12.07 .67	9.2 2.9	28.86 .27	15.6 2.3	25.60 .48	51.1 2.9	21.43 .28	62.2 1.7
18.6	12.69 .56	12.3 3.3	29.11 .24	17.9 2.2	26.04 .41	54.2 3.2	21.69 .25	60.6 1.5
28.6	13.18 .43	15.7 3.5	29.33 .20	20.0 2.1	26.42 .34	57.5 3.4	21.93 .22	59.2 1.3
Aug. 7.6	13.55 .30	19.3 3.7	29.52 .16	22.1 2.0	26.71 .26	61.1 3.6	22.13 .18	58.1 1.0
17.5	13.79 .17	23.1 3.8	29.66 .12	24.0 1.8	26.93 .17	64.8 3.7	22.28 .14	57.2 0.8
27.5	13.88 +.03	26.9 3.8	29.76 .08	25.7 1.6	27.06 +.09	68.5 3.7	22.40 .09	56.6 0.5
Sept. 6.5	13.84 -.11	30.7 3.8	29.81 +.04	27.1 1.4	27.10 .00	72.2 3.7	22.47 .05	56.2 0.3
16.5	13.66 .24	34.5 3.6	29.83 .00	28.4 1.1	27.06 -.08	75.8 3.5	22.50 +.01	56.0 +0.1
26.4	13.37 .26	38.0 3.4	29.81 -.04	29.4 0.9	26.95 .15	79.2 3.3	22.49 -.03	56.0 -0.1
Oct. 6.4	12.95 .47	41.3 3.1	29.76 .07	30.2 0.6	26.76 .22	82.4 3.0	22.45 .06	56.3 0.3
16.4	12.42 .57	44.3 2.8	29.68 .00	30.7 0.4	26.50 .28	85.3 2.7	22.38 .08	56.6 0.4
26.3	11.81 .68	46.9 2.4	29.58 .11	31.0 +0.2	26.19 .34	87.8 2.3	22.29 .10	57.1 0.5
Nov. 5.3	11.11 .73	49.0 1.9	29.46 .12	31.0 0.0	25.83 .38	89.8 1.8	22.18 .11	57.7 0.6
15.3	10.36 .78	50.6 1.3	29.34 .12	30.9 -0.2	25.44 .41	91.4 1.3	22.06 .12	58.3 0.6
25.3	9.57 .80	51.7 0.8	29.22 .12	30.5 0.4	25.02 .43	92.4 0.7	21.94 .12	58.9 0.6
Dec. 5.2	8.76 .81	52.1 +0.1	29.10 .11	30.0 0.6	24.58 .44	92.8 +0.1	21.83 .11	59.6 0.6
15.2	7.95 .79	51.9 -0.5	28.90 .10	29.3 0.8	24.15 .43	92.6 -0.5	21.72 .10	60.1 0.6
25.2	7.19 .74	51.2 1.1	28.80 .09	28.4 0.9	23.73 .41	91.9 1.0	21.62 .09	60.7 0.5
35.2	6.47 -.67	49.8 -1.7	28.81 -.07	27.4 -1.1	23.34 -.37	90.5 -1.6	21.54 -.07	61.1 -0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Piscis Australis. (Fomalhaut.)		$\alpha$ Pegasi. (Markab.)		$\gamma$ Cephei.		$\theta$ Piscium.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 22 <sup>m</sup> 50	<sup>°</sup> -30 <sup>'</sup> 15	<sup>h</sup> 22 <sup>m</sup> 58	<sup>°</sup> +14 <sup>'</sup> 33	<sup>h</sup> 23 <sup>m</sup> 13	<sup>°</sup> +67 <sup>'</sup> 26	<sup>h</sup> 23 <sup>m</sup> 21	<sup>°</sup> +5 <sup>'</sup> 42
Jan. 0.2	58.11 -10	52.7 +0.3	44.23 -09	25.1 -1.0	38.47 -44	78.8 -1.0	50.18 -09	59.0 -0.7
10.2	58.02 .08	52.2 0.6	44.14 .08	24.0 1.1	38.05 .41	77.6 1.5	50.09 .08	58.2 0.8
20.1	57.95 .05	51.5 0.8	44.08 .06	22.8 1.2	37.66 .38	75.8 2.0	50.02 .07	57.4 0.8
30.1	57.92 -02	50.5 1.1	44.03 .03	21.6 1.2	37.34 .29	73.5 2.4	49.96 .05	56.6 0.8
Feb. 9.1	57.91 +01	49.3 1.3	44.01 -01	20.4 1.2	37.09 .21	70.9 2.7	49.93 -02	55.9 0.7
19.1	57.93 .04	47.8 1.6	44.02 +02	19.2 1.1	36.92 .12	68.1 2.9	49.92 .00	55.2 0.5
Mar. 1.0	57.99 .07	46.1 1.8	44.05 .06	18.2 0.9	36.85 -02	65.1 3.0	49.93 +03	54.8 0.4
11.0	58.08 .11	44.2 2.0	44.13 .09	17.4 0.7	36.88 +02	62.1 2.9	49.99 .07	54.5 -0.2
21.0	58.21 .15	42.2 2.1	44.24 .13	16.9 0.4	37.02 .19	59.3 2.8	50.07 .10	54.5 +0.1
30.9	58.38 .19	40.0 2.2	44.38 .17	16.6 -0.1	37.27 .29	56.6 2.5	50.20 .14	54.7 0.4
Apr. 9.9	58.58 .22	37.7 2.3	44.57 .20	16.6 +0.2	37.61 .39	54.4 2.1	50.36 .12	55.2 0.6
19.9	58.82 .26	35.4 2.3	44.79 .24	17.1 0.6	38.04 .47	52.5 1.6	50.55 .21	56.0 0.9
29.9	59.10 .29	33.1 2.3	45.04 .27	17.8 0.9	38.55 .54	51.1 1.1	50.78 .25	57.1 1.2
May 9.8	59.40 .32	30.8 2.2	45.33 .29	18.9 1.3	39.12 .60	50.3 -0.5	51.05 .28	58.4 1.5
19.8	59.73 .34	28.6 2.1	45.63 .31	20.3 1.6	39.74 .63	50.0 0.0	51.33 .30	60.0 1.7
29.8	60.08 .35	26.5 2.0	45.94 .32	22.0 1.8	40.39 .65	50.4 +0.6	51.64 .31	61.8 1.9
June 8.8	60.43 .35	24.7 1.8	46.27 .32	24.0 2.1	41.04 .68	51.3 1.2	51.95 .32	63.8 2.0
18.7	60.78 .35	23.0 1.5	46.59 .32	26.1 2.2	41.69 .64	52.7 1.7	52.27 .32	65.9 2.1
28.7	61.13 .34	21.7 1.2	46.91 .31	28.4 2.3	42.32 .60	54.7 2.2	52.59 .31	68.0 2.1
July 8.7	61.45 .31	20.7 0.9	47.20 .29	30.7 2.4	42.90 .55	57.1 2.6	52.89 .29	70.2 2.1
18.6	61.76 .28	20.0 0.5	47.47 .26	33.1 2.3	43.42 .49	59.9 3.0	53.18 .27	72.3 2.0
28.6	62.02 .25	19.6 +0.2	47.71 .22	35.4 2.3	43.88 .42	63.0 3.3	53.43 .24	74.2 1.9
Aug. 7.6	62.25 .20	19.6 -0.2	47.92 .18	37.7 2.2	44.26 .34	66.4 3.5	53.65 .20	76.1 1.7
17.6	62.43 .16	19.9 0.5	48.08 .14	39.8 2.0	44.56 .26	70.0 3.6	53.84 .16	77.7 1.6
27.5	62.56 .11	20.6 0.8	48.20 .10	41.7 1.8	44.78 .17	73.7 3.7	53.98 .12	79.2 1.3
Sept. 6.5	62.65 .06	21.5 1.0	48.29 .06	43.4 1.8	44.90 +06	77.4 3.7	54.08 .08	80.5 1.1
16.5	62.68 +01	22.6 1.2	48.33 +02	45.0 1.4	44.94 -01	81.1 3.6	54.15 .05	81.5 0.9
26.5	62.67 -03	23.8 1.3	48.33 -01	46.2 1.2	44.89 .09	84.7 3.5	54.18 +01	82.3 0.7
Oct. 6.4	62.62 .07	25.2 1.4	48.30 .05	47.3 0.9	44.75 .17	88.1 3.3	54.17 -02	82.8 0.4
16.4	62.53 .10	26.6 1.4	48.23 .07	48.1 0.7	44.55 .24	91.2 3.0	54.13 .06	83.1 +0.2
26.4	62.42 .12	27.9 1.3	48.15 .09	48.6 0.4	44.27 .31	94.0 2.6	54.07 .07	83.3 0.0
Nov. 5.3	62.28 .14	29.1 1.1	48.05 .11	48.9 +0.1	43.94 .36	96.4 2.2	53.99 .09	83.2 -0.1
15.3	62.14 .15	30.2 0.9	47.94 .12	48.9 -0.1	43.55 .41	98.3 1.7	53.89 .10	83.0 0.3
25.3	61.99 .15	31.0 0.7	47.82 .12	48.7 0.3	43.13 .44	99.7 1.1	53.78 .11	82.6 0.4
Dec. 5.3	61.84 .14	31.6 0.5	47.70 .12	48.2 0.5	42.68 .46	100.6 +0.6	53.68 .11	82.1 0.6
15.2	61.70 .13	31.9 -0.2	47.58 .11	47.6 0.7	42.21 .47	100.9 0.0	53.57 .11	81.4 0.7
25.2	61.57 .12	32.0 +0.1	47.47 .10	46.7 0.9	41.75 .46	100.5 -0.6	53.46 .10	80.7 0.8
35.2	61.47 -10	31.7 +0.4	47.38 -09	45.7 -1.1	41.30 -43	99.6 -1.2	53.36 -09	79.9 -0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♌ Piscium.		*γ Cephei.		*Groombridge 4163.		♍ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 23 33	<sup>m</sup> +4 58	<sup>h</sup> 23 34	<sup>m</sup> +76° 57	<sup>h</sup> 23 48	<sup>m</sup> +73° 44	<sup>h</sup> 23 53	<sup>m</sup> +6 11
Jan. 0.2	44.14 -10	20.2 -0.8	21.11 -85	49.4 -0.5	56.43 -66	36.5 -0.4	6.49 -10	43.4 -0.7
10.2	44.05 .08	19.4 0.8	20.28 .80	48.6 1.1	55.78 .64	35.8 1.0	6.39 .09	42.6 0.8
20.2	43.96 .07	18.7 0.8	19.51 .73	47.1 1.7	55.17 .59	34.5 1.6	6.30 .08	41.9 0.8
30.1	43.90 .05	17.9 0.7	18.83 .68	45.2 2.2	54.62 .51	32.7 2.1	6.22 .07	41.1 0.7
Feb. 9.1	43.86 .03	17.2 0.6	18.28 .49	42.8 2.6	54.15 .41	30.4 2.5	6.16 .05	40.4 0.7
19.1	43.84 -0.1	16.6 0.5	17.86 .34	40.0 2.9	53.80 .30	27.8 2.8	6.12 -0.3	39.8 0.5
Mar. 1.0	43.85 +0.2	16.2 0.3	17.61 -17	37.1 3.0	53.56 .16	24.9 3.0	6.11 .00	39.4 0.4
11.0	43.89 .06	16.0 -0.1	17.53 +0.1	34.0 3.1	53.47 -0.2	21.9 3.0	6.13 +0.4	39.1 -0.2
21.0	43.96 .09	16.0 +0.1	17.64 .20	30.9 3.0	53.52 +1.2	18.9 3.0	6.19 .07	39.0 0.0
31.0	44.07 .13	16.2 0.4	17.93 .38	28.0 2.8	53.72 .27	16.0 2.8	6.26 .11	39.2 +0.3
Apr. 9.9	44.22 .17	16.7 0.7	18.39 .54	25.4 2.5	54.06 .41	13.3 2.5	6.41 .15	39.6 0.6
19.9	44.41 .21	17.6 0.9	19.01 .69	23.1 2.1	54.54 .54	11.0 2.1	6.58 .19	40.3 0.9
29.9	44.64 .24	18.6 1.2	19.77 .82	21.3 1.6	55.13 .65	9.1 1.6	6.79 .23	41.3 1.1
May 9.9	44.89 .27	20.0 1.5	20.64 .92	20.0 1.0	55.83 .74	7.7 1.1	7.03 .26	42.6 1.4
19.8	45.17 .29	21.6 1.7	21.60 .99	19.3 -0.5	56.60 .81	6.0 -0.6	7.31 .28	44.1 1.6
29.8	45.47 .31	23.4 1.9	22.62 1.04	19.1 +0.1	57.43 .85	6.6 0.0	7.60 .30	45.9 1.8
June 8.8	45.70 .32	25.4 2.0	23.67 1.05	19.5 0.7	58.30 .87	6.9 +0.6	7.91 .32	47.8 2.0
18.7	46.11 .32	27.4 2.1	24.71 1.03	20.5 1.3	59.17 .87	7.7 1.1	8.23 .32	49.8 2.1
28.7	46.43 .31	29.5 2.1	25.72 .99	22.0 1.8	60.02 .84	9.1 1.7	8.56 .32	51.9 2.1
July 8.7	46.74 .30	31.6 2.1	26.68 .92	24.0 2.3	60.84 .79	11.0 2.1	8.87 .31	54.0 2.1
18.7	47.03 .28	33.7 2.0	27.56 .83	26.5 2.7	61.60 .73	13.4 2.6	9.17 .29	56.1 2.0
28.6	47.29 .25	35.6 1.9	28.34 .72	29.4 3.1	62.29 .63	16.2 2.9	9.44 .26	58.1 1.9
Aug. 7.6	47.52 .21	37.4 1.7	29.00 .60	32.6 3.3	62.89 .55	19.3 3.2	9.69 .23	59.9 1.8
17.6	47.72 .18	39.1 1.5	29.54 .47	36.1 3.6	63.39 .45	22.6 3.5	9.90 .19	61.6 1.6
27.6	47.87 .14	40.5 1.3	29.95 .33	39.7 3.7	63.78 .34	26.2 3.7	10.07 .15	63.1 1.4
Sept. 6.5	47.99 .10	41.6 1.1	30.21 .19	43.5 3.8	64.06 .22	29.9 3.7	10.20 .12	64.4 1.2
16.5	48.07 .06	42.6 0.8	30.32 +0.4	47.3 3.8	64.23 +1.1	33.7 3.8	10.30 .08	65.4 0.9
26.5	48.11 +0.2	43.3 0.6	30.30 -10	51.1 3.7	64.23 -0.1	37.5 3.7	10.36 .04	66.2 0.7
Oct. 6.4	48.11 -0.1	43.8 0.4	30.13 .24	54.8 3.6	64.21 .12	41.1 3.6	10.39 +0.1	66.8 0.5
16.4	48.09 .04	44.1 +0.2	29.83 .37	58.3 3.3	64.04 .23	44.6 3.4	10.38 -0.2	67.1 0.2
26.4	48.03 .06	44.2 0.0	29.40 .49	61.5 3.0	63.76 .33	47.8 3.1	10.34 .05	67.3 +0.1
Nov. 5.4	47.96 .08	44.1 -0.2	28.85 .60	64.3 2.6	63.38 .42	50.7 2.7	10.29 .07	67.3 -0.1
15.3	47.87 .09	43.8 0.3	28.20 .68	66.8 2.2	62.92 .50	53.2 2.2	10.21 .08	67.1 0.3
25.3	47.78 .10	43.4 0.5	27.47 .77	68.7 1.7	62.38 .57	55.2 1.7	10.12 .09	66.7 0.4
Dec. 5.3	47.67 .11	42.9 0.6	26.67 .83	70.1 1.1	61.78 .62	56.6 1.2	10.02 .10	66.2 0.5
15.3	47.57 .11	42.2 0.7	25.82 .86	70.9 +0.5	61.14 .65	57.5 +0.6	9.92 .10	65.6 0.6
25.2	47.46 .10	41.5 0.7	24.96 .86	71.0 -0.1	60.48 .67	57.8 0.0	9.81 .10	64.9 0.7
35.2	47.36 -10	40.7 -0.8	24.11 -84	70.6 -0.7	59.82 -65	57.5 -0.6	9.71 -10	64.2 -0.7

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly Motion, Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
1879.										
Jan. 1	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
2	18 47 45.53	46.24	-23 0 7.4	6.6	11.036	+12.57	+ 3 51.32	16 18.40	11.08	18 43 54.27
3	18 52 10.21	11.02	22 54 51.5	50.5	11.021	13.72	4 19.47	18.40	11.04	18 47 50.83
4	18 56 34.51	35.41	22 49 8.3	7.1	11.004	14.86	4 47.23	18.40	10.99	18 51 47.39
5	19 0 58.51	59.39	22 42 57.9	56.5	10.986	15.99	5 14.58	18.40	10.93	18 55 43.94
6	19 5 21.88	22.94	22 36 20.6	19.0	10.968	17.11	5 41.48	18.38	10.87	18 59 40.50
7	19 9 44.89	46.03	22 29 16.5	14.6	10.949	18.22	6 7.92	18.36	10.81	19 3 37.06
8	19 14 7.41	8.63	22 21 45.8	43.7	10.928	19.32	6 33.89	18.33	10.75	19 7 33.62
9	19 18 29.43	30.72	22 13 48.8	46.4	10.906	20.42	6 59.36	18.30	10.68	19 11 30.18
10	19 22 50.93	52.29	22 5 25.6	22.9	10.884	21.50	7 24.32	18.26	10.60	19 15 26.74
11	19 27 11.88	13.31	21 56 36.6	33.5	10.861	22.57	7 48.72	18.21	10.52	19 19 23.29
12	19 31 32.27	33.77	21 47 21.9	18.5	10.837	23.63	8 12.55	18.16	10.44	19 23 19.85
13	19 35 52.07	53.64	21 37 41.7	38.1	10.812	24.69	8 35.80	18.11	10.36	19 27 16.41
14	19 40 11.27	12.90	21 27 36.4	32.5	10.786	25.73	8 58.44	18.05	10.28	19 31 12.97
15	19 44 29.85	31.54	21 17 6.2	1.9	10.760	26.76	9 20.46	17.98	10.19	19 35 9.52
16	19 48 47.79	49.54	21 6 11.5	6.9	10.733	27.78	9 41.86	17.90	10.10	19 39 6.08
17	19 53 5.07	6.88	20 54 52.4	47.5	10.706	28.79	10 2.59	17.82	10.00	19 43 2.63
18	19 57 21.68	23.54	20 43 9.3	4.0	10.677	29.79	10 22.64	17.74	9.90	19 46 59.19
19	20 1 37.58	39.49	20 30 62.4	56.8	10.648	30.77	10 41.98	17.65	9.80	19 50 55.75
20	20 5 52.77	54.73	20 18 32.3	26.4	10.617	31.73	11 0.69	17.56	9.70	19 54 52.31
21	20 10 7.23	9.24	20 5 39.2	32.9	10.586	32.68	11 18.51	17.46	9.59	19 58 48.87
22	20 14 20.94	22.99	19 52 23.5	16.9	10.555	33.62	11 35.65	17.36	9.49	20 2 45.43
23	20 18 33.88	35.97	19 38 45.6	38.7	10.523	34.53	11 52.03	17.26	9.38	20 6 41.98
24	20 22 46.05	48.18	19 24 45.9	38.7	10.490	35.44	12 7.65	17.16	9.27	20 10 38.54
25	20 26 57.43	59.60	19 10 24.6	17.1	10.457	36.33	12 22.47	17.05	9.16	20 14 35.10
26	20 31 8.01	10.21	18 55 42.2	34.3	10.423	37.19	12 36.48	16.93	9.05	20 18 31.66
27	20 35 17.77	20.00	18 40 39.2	31.0	10.389	38.05	12 49.69	16.81	8.94	20 22 28.21
28	20 39 26.71	28.97	18 25 15.9	7.4	10.355	38.89	13 2.09	16.69	8.83	20 26 24.77
29	20 43 34.82	37.11	18 9 32.8	24.0	10.320	39.70	13 13.62	16.57	8.72	20 30 21.32
30	20 47 42.09	44.40	17 53 30.2	21.1	10.286	40.50	13 24.32	16.44	8.61	20 34 17.88
31	20 51 48.52	50.84	17 36 68.6	59.2	10.251	41.28	13 34.18	16.31	8.49	20 38 14.44
Feb. 1	20 55 54.11	56.45	17 20 28.4	18.7	10.215	42.05	13 43.21	16.17	8.38	20 42 11.00
2	20 59 58.86	61.22	17 3 29.8	19.9	10.180	42.81	13 51.40	16.03	8.26	20 46 7.55
3	21 4 2.77	5.14	16 46 13.4	3.2	10.145	43.54	13 58.74	15.88	8.15	20 50 4.11
4	21 8 5.85	8.23	16 28 39.5	20.0	10.111	44.26	14 5.25	15.73	8.03	20 54 0.66
5	21 12 8.10	10.49	16 10 48.6	37.9	10.076	44.97	14 10.94	15.58	7.92	20 57 57.22
6	21 16 9.52	11.91	15 52 41.0	30.2	10.042	45.65	14 15.81	15.41	7.80	21 1 53.77
7	21 20 10.13	12.52	15 34 17.2	6.1	10.008	46.32	14 19.86	15.24	7.69	21 5 50.33
8	21 24 9.94	12.33	15 15 37.4	26.1	9.978	46.97	14 23.09	15.07	7.57	21 9 46.88
9	21 28 8.95	11.34	14 56 42.2	30.8	9.942	47.61	14 25.53	14.90	7.46	21 13 43.44
10	21 32 7.17	9.56	14 37 31.8	20.1	9.910	48.24	14 27.18	14.72	7.35	21 17 39.99
11	21 36 4.62	7.01	14 17 66.7	54.9	9.878	48.84	14 28.07	14.53	7.24	21 21 36.55
12	21 40 1.31	3.69	13 58 27.2	15.3	9.847	49.43	14 28.20	14.34	7.12	21 25 33.11
13	21 43 57.25	59.62	13 38 33.8	21.8	9.816	50.00	14 27.59	14.14	7.01	21 29 29.67
14	21 47 52.45	54.81	13 18 26.9	14.8	9.786	50.56	14 26.22	13.94	6.90	21 33 26.22
15	21 51 46.92	49.26	12 57 66.9	54.7	9.756	51.09	14 24.12	13.74	6.79	21 37 22.78
16	21 55 40.66	42.99	12 37 34.2	21.9	9.726	51.62	14 21.31	13.53	6.69	21 41 19.33
17	21 59 33.70	36.01	12 16 49.2	36.8	9.696	52.11	14 17.79	13.32	6.58	21 45 15.89
18	22 3 26.04	28.33	11 55 52.4	39.9	9.667	52.60	14 13.57	13.10	6.48	21 49 12.43
19	22 7 17.69	19.96	11 34 44.2	31.7	9.638	53.07	14 8.67	12.88	6.38	21 53 8.99
20	22 11 8.67	10.92	11 13 24.9	12.4	9.610	53.52	14 3.09	12.66	6.28	21 57 5.54
21	22 14 58.98	61.21	10 51 55.1	42.6	9.583	53.96	13 56.83	12.44	6.18	21 1 2.10
22	22 18 48.63	50.84	10 30 15.3	2.8	9.556	54.36	13 49.91	12.22	6.09	22 4 58.65
23	22 22 37.64	39.82	10 8 25.8	13.3	9.529	54.75	13 42.36	12.00	6.00	22 8 55.21
24	22 26 26.02	28.16	9 46 27.0	14.6	9.502	55.13	13 34.18	11.77	5.91	22 12 51.76
25	22 30 13.78	15.89	9 24 19.5	7.2	9.477	55.48	13 25.37	11.55	5.82	22 16 48.32
26	22 34 0.93	3.01	9 1 63.6	51.3	9.452	55.82	13 15.97	11.32	5.74	22 20 44.87
27	22 37 47.49	49.54	8 39 39.8	27.5	9.428	56.15	13 5.98	11.09	5.65	22 24 41.43
28	22 41 33.48	35.50	8 16 68.4	56.2	9.404	56.45	12 55.41	10.86	5.57	22 28 37.98
29	22 45 18.91	20.89	- 7 54 29.9	17.8	9.381	+56.74	+12 44.23	16 10.63	5.50	22 32 34.54

NOTE.—For Mean Interval of Semidiameter passing the Meridian, subtract 0.19 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly Motion. Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Appar-ent Noon.	Mean Noon.	Appar-ent Noon.	Right Ascen-sion.	Decli-nation.				
1879.										
Mar. 1	h m s	h m s	h m s	h m s	s	"	m s	m s	m s	h m s
2	22 49 3.79	5.73	- 7 31 44.6	32.7	9.360	+57.02	+12 32.60	16 10.39	1 5.43	22 36 31.09
3	22 52 48.15	50.06	7 8 53.1	41.3	9.339	57.27	12 20.40	10.15	5.36	22 40 27.65
4	22 56 32.00	33.88	6 45 55.6	44.0	9.318	57.51	12 7.70	9.91	5.29	22 44 24.20
5	23 0 15.37	17.21	6 22 52.5	41.0	9.298	57.73	11 54.52	9.67	5.22	22 48 20.76
6	23 3 58.27	60.07	5 59 44.2	32.9	9.279	57.94	11 40.86	9.42	5.16	22 52 17.30
7	23 7 40.74	42.50	5 36 31.2	20.1	9.261	58.14	11 26.77	9.17	5.10	22 56 13.86
8	23 11 22.79	24.51	5 13 13.5	2.6	9.244	58.32	11 12.28	8.91	5.04	23 0 10.41
9	23 15 4.45	6.13	4 49 51.8	41.1	9.228	58.48	10 57.39	8.65	4.98	23 4 6.96
10	23 18 45.73	47.36	4 26 26.2	15.8	9.213	58.63	10 42.12	8.39	4.92	23 8 3.51
11	23 22 26.66	28.25	4 2 57.3	47.1	9.199	58.77	10 26.49	8.13	4.87	23 12 0.07
12	23 26 7.27	8.82	3 39 25.2	15.2	9.185	58.90	10 10.55	7.86	4.82	23 15 56.62
13	23 29 47.58	49.09	3 15 50.5	40.8	9.173	59.01	9 54.30	7.59	4.77	23 19 53.18
14	23 33 27.61	29.08	2 52 13.4	4.0	9.162	59.09	9 37.78	7.32	4.73	23 23 49.73
15	23 37 7.38	8.80	2 28 34.3	25.2	9.152	59.16	9 20.99	7.05	4.69	23 27 46.29
16	23 40 46.91	48.29	2 4 53.6	44.8	9.143	59.22	9 3.95	6.77	4.65	23 31 42.84
17	23 44 26.23	27.56	1 41 11.7	3.2	9.134	59.27	8 46.72	6.50	4.62	23 35 39.40
18	23 48 5.35	6.63	1 17 28.9	20.7	9.127	59.29	8 29.30	6.22	4.59	23 39 35.94
19	23 51 44.30	45.53	0 53 45.6	37.6	9.120	59.30	8 11.70	5.95	4.57	23 43 32.50
20	23 55 23.09	24.27	0 29 62.2	54.5	9.114	59.30	7 53.94	5.67	4.55	23 47 29.05
21	23 59 1.75	2.89	- 0 6 19.1	11.7	9.108	59.27	7 36.05	5.39	4.53	23 51 25.61
22	0 2 40.29	41.39	+ 0 17 23.4	30.5	9.103	59.24	7 18.05	5.11	4.51	23 55 22.15
23	0 6 18.72	19.77	0 41 4.8	11.6	9.099	59.19	6 59.94	4.84	4.49	23 59 18.71
24	0 9 57.06	58.06	1 4 44.7	51.2	9.095	59.12	6 41.72	4.56	4.48	0 3 15.26
25	0 13 35.32	36.28	1 28 22.8	29.0	9.093	59.04	6 23.44	4.29	4.48	0 7 11.82
26	0 17 13.53	14.44	1 51 58.6	64.5	9.091	58.94	6 5.10	4.01	4.47	0 11 8.37
27	0 20 51.71	52.57	2 15 31.9	37.4	9.090	58.82	5 46.73	3.74	4.47	0 15 4.93
28	0 24 29.87	30.68	2 39 2.2	7.4	9.089	58.69	5 28.34	3.47	4.47	0 19 1.47
29	0 28 8.03	8.80	3 2 29.1	34.0	9.089	58.55	5 9.94	3.20	4.47	0 22 54.03
30	0 31 46.20	46.93	3 25 52.4	57.0	9.090	58.38	4 51.56	2.92	4.47	0 26 54.58
31	0 35 24.40	25.08	3 49 11.5	15.8	9.093	58.21	4 33.22	2.65	4.48	0 30 51.14
Apr. 1	0 39 2.66	3.29	4 12 26.4	30.4	9.096	58.02	4 14.92	2.38	4.49	0 34 47.69
2	0 42 41.00	41.59	4 35 36.6	40.3	9.099	57.82	3 56.71	2.10	4.51	0 38 44.25
3	0 46 19.43	19.98	4 58 41.7	45.1	9.103	57.60	3 38.59	1.83	4.53	0 42 40.79
4	0 49 57.97	58.47	5 21 41.5	44.6	9.109	57.37	3 20.59	1.55	4.55	0 46 37.35
5	0 53 36.65	37.11	5 44 35.5	38.3	9.115	57.12	3 2.72	1.28	4.57	0 50 33.90
6	0 57 15.50	15.91	6 7 23.5	26.0	9.123	56.86	2 45.02	1.01	4.60	0 54 30.46
7	1 0 54.53	54.89	6 30 5.1	7.3	9.131	56.59	2 27.49	0.74	4.63	0 58 27.01
8	1 4 33.76	34.08	6 52 40.1	42.0	9.139	56.31	2 10.16	0.46	4.66	1 2 23.57
9	1 8 13.21	13.48	7 15 8.2	9.8	9.148	56.01	1 53.08	16 0.19	4.70	1 6 20.11
10	1 11 52.91	53.14	7 37 29.1	30.5	9.159	55.70	1 36.24	15 59.91	4.74	1 10 16.67
11	1 15 32.87	33.06	7 59 42.3	43.4	9.171	55.38	1 19.65	15 59.63	4.77	1 14 13.22
12	1 19 13.12	13.27	8 21 47.6	48.5	9.183	55.05	1 3.36	15 59.35	4.81	1 18 9.78
13	1 22 53.67	53.78	8 43 44.6	45.2	9.196	54.69	0 47.37	15 59.08	4.86	1 22 6.30
14	1 26 34.55	34.62	9 5 33.0	33.4	9.210	54.33	0 31.69	15 58.80	4.90	1 26 2.86
15	1 30 15.77	15.80	9 27 12.5	12.7	9.224	53.96	0 16.35	15 58.53	4.95	1 29 59.44
16	1 33 57.35	57.34	9 48 42.7	42.7	9.239	53.56	+ 0 1.36	15 58.25	5.00	1 33 56.00
17	1 37 39.30	39.26	10 10 3.3	3.0	9.256	53.15	- 0 13.25	15 57.98	5.05	1 37 52.55
18	1 41 21.64	21.56	10 31 13.8	13.3	9.273	52.72	0 27.46	15 57.71	5.10	1 41 49.11
19	1 45 4.37	4.25	10 52 14.1	13.5	9.290	52.28	0 41.27	15 57.44	5.16	1 45 45.66
20	1 48 47.51	47.35	11 13 3.6	2.8	9.307	51.83	0 54.68	15 57.18	5.22	1 49 42.22
21	1 52 31.06	30.87	11 33 42.1	41.1	9.325	51.36	1 7.68	15 56.92	5.28	1 53 38.76
22	1 56 15.05	14.83	11 54 9.1	8.0	9.342	50.87	1 20.26	15 56.66	5.34	1 57 35.32
23	1 59 59.48	59.22	12 14 24.5	23.2	9.360	50.37	1 32.38	15 56.40	5.41	2 1 31.87
24	2 3 44.35	44.06	12 34 27.7	26.2	9.379	49.86	1 44.06	15 56.15	5.47	2 5 28.43
25	2 7 29.68	29.36	12 54 18.5	16.8	9.398	49.34	1 55.28	15 55.90	5.54	2 9 24.98
26	2 11 15.47	15.12	13 13 56.4	54.6	9.418	48.80	2 6.04	15 55.65	5.61	2 13 21.54
27	2 15 1.47	1.36	13 33 21.3	19.4	9.438	48.25	2 16.33	15 55.41	5.68	2 17 18.09
28	2 18 48.49	48.09	13 52 32.6	30.6	9.457	47.69	2 26.13	15 55.17	5.76	2 21 14.65
29	2 22 35.72	35.29	14 11 30.3	28.2	9.477	47.11	2 35.44	15 54.93	5.84	2 25 11.20
30	2 26 23.44	22.99	14 30 13.9	11.7	9.498	46.52	2 44.27	15 54.69	5.92	2 29 7.76
31	2 30 11.67	11.21	+14 48 43.0	40.7	9.520	+45.91	- 2 52.60	15 54.46	1 6.00	2 33 4.31

NOTE.—For Mean interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.



## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly Motion, Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
1879.	h m s	h m s	h m s	h m s	h m s	h m s	m s	h m s	h m s	h m s
May 1	2 33 60.42	59.94	+15 6 57.5	55.2	9.542	45.29	-3 0.41	15 54.23	1 6.08	2 37 0.87
2	2 37 49.70	49.20	15 24 56.9	54.5	9.565	44.66	3 7.69	54.00	6.15	2 40 57.42
3	2 41 39.51	38.99	15 42 41.1	38.6	9.587	44.02	3 14.45	53.77	6.23	2 44 53.98
4	2 45 29.85	29.31	16 0 9.7	7.2	9.609	43.37	3 20.69	53.54	6.31	2 48 50.54
5	2 49 20.74	20.18	16 17 22.5	20.0	9.632	42.71	3 26.35	53.31	6.39	2 52 47.10
6	2 53 12.19	11.61	16 34 19.0	16.5	9.656	42.01	3 31.46	53.09	6.47	2 56 43.65
7	2 57 4.20	3.61	16 50 59.2	56.7	9.680	41.32	3 36.00	52.86	6.55	3 0 40.21
8	3 0 56.78	56.18	17 7 22.5	20.0	9.704	40.62	3 39.96	52.64	6.64	3 4 36.76
9	3 4 49.96	49.35	17 23 28.9	26.4	9.728	39.90	3 43.34	52.42	6.72	3 8 33.32
10	3 8 43.73	43.11	17 39 17.9	15.4	9.752	39.17	3 46.13	52.20	6.80	3 12 29.87
11	3 12 38.09	37.47	17 54 49.4	46.9	9.776	38.43	3 48.32	51.98	6.88	3 16 26.43
12	3 16 33.03	32.40	18 10 2.9	0.4	9.801	37.68	3 49.93	51.78	6.97	3 20 22.98
13	3 20 28.56	27.92	18 24 58.2	55.8	9.826	36.92	3 50.96	51.57	7.05	3 24 19.54
14	3 24 24.69	24.05	18 39 34.9	32.6	9.851	36.14	3 51.40	51.36	7.13	3 28 16.10
15	3 28 21.42	20.78	18 53 52.9	50.6	9.876	35.35	3 51.24	51.16	7.21	3 32 12.66
16	3 32 18.74	18.10	19 7 51.8	49.6	9.900	34.55	3 50.48	50.96	7.29	3 36 9.21
17	3 36 16.63	15.99	19 21 31.4	29.3	9.924	33.73	3 49.14	50.76	7.37	3 40 5.77
18	3 40 15.09	14.45	19 34 51.3	49.3	9.947	32.91	3 47.24	50.57	7.45	3 44 2.32
19	3 44 14.12	13.49	19 47 51.2	49.2	9.971	32.08	3 44.76	50.38	7.53	3 47 58.88
20	3 48 13.71	13.08	20 0 30.8	28.8	9.994	31.23	3 41.73	50.20	7.61	3 51 55.44
21	3 52 13.84	13.22	20 12 50.0	48.1	10.017	30.37	3 38.15	50.02	7.69	3 55 52.00
22	3 56 14.51	13.91	20 24 48.4	46.6	10.039	29.50	3 34.04	49.85	7.76	3 59 48.55
23	4 0 15.70	15.11	20 36 25.9	24.2	10.060	28.62	3 29.42	49.68	7.83	4 3 45.11
24	4 4 17.39	16.81	20 47 42.1	40.5	10.081	27.73	3 24.29	49.52	7.90	4 7 41.67
25	4 8 19.58	19.01	20 58 36.8	35.3	10.101	26.83	3 18.66	49.36	7.97	4 11 38.23
26	4 12 22.25	21.70	21 9 9.9	8.5	10.121	25.92	3 12.55	49.20	8.04	4 15 34.78
27	4 16 25.39	24.86	21 19 21.0	19.7	10.140	25.00	3 5.97	49.05	8.11	4 19 31.34
28	4 20 28.99	28.48	21 29 10.1	8.9	10.159	24.08	2 58.04	48.90	8.18	4 23 27.90
29	4 24 33.02	32.53	21 38 36.8	35.7	10.177	23.14	2 51.46	48.76	8.24	4 27 24.46
30	4 28 37.48	37.01	21 47 41.1	40.1	10.194	22.20	2 43.55	48.62	8.30	4 31 21.01
31	4 32 42.35	41.90	21 56 22.7	21.8	10.211	21.25	2 35.24	48.48	8.36	4 35 17.57
June 1	4 36 47.62	47.20	22 4 41.4	40.5	10.227	20.29	2 26.52	48.35	8.42	4 39 14.13
2	4 40 53.29	52.90	22 12 37.1	36.4	10.243	19.33	2 17.40	48.22	8.48	4 43 10.69
3	4 44 59.34	58.98	22 20 9.6	9.0	10.258	18.36	2 7.91	48.09	8.53	4 47 7.24
4	4 49 5.74	5.41	22 27 18.7	18.1	10.273	17.39	1 58.07	47.96	8.58	4 51 3.80
5	4 53 12.49	12.18	22 34 4.3	3.8	10.288	16.41	1 47.88	47.84	8.63	4 55 0.36
6	4 57 19.57	19.29	22 40 26.3	25.9	10.301	15.42	1 37.35	47.72	8.67	4 58 56.92
7	5 1 26.97	26.72	22 46 24.5	24.1	10.314	14.43	1 26.51	47.61	8.71	5 2 53.48
8	5 5 34.67	34.46	22 51 58.8	58.5	10.327	13.43	1 15.37	47.50	8.75	5 6 50.04
9	5 9 42.66	42.48	22 57 9.1	8.9	10.338	12.43	1 3.94	47.49	8.79	5 10 46.50
10	5 13 50.91	50.76	23 1 55.2	55.1	10.349	11.42	0 52.24	47.28	8.82	5 14 43.15
11	5 17 59.42	59.30	23 6 17.0	16.9	10.359	10.41	0 40.30	47.18	8.85	5 18 39.71
12	5 22 8.15	8.07	23 10 14.4	14.3	10.368	9.39	0 28.13	47.08	8.88	5 22 36.27
13	5 26 17.08	17.04	23 13 47.3	47.3	10.376	8.36	0 15.75	46.98	8.90	5 26 32.83
14	5 30 26.20	26.19	23 16 55.6	55.6	10.383	7.33	-0 3.18	46.89	8.92	5 30 29.39
15	5 34 35.48	35.51	23 19 39.3	39.3	10.389	6.30	+0 9.54	46.81	8.93	5 34 25.94
16	5 38 44.88	44.95	23 21 58.3	58.3	10.393	5.27	0 22.39	46.73	8.95	5 38 22.50
17	5 42 54.39	54.49	23 23 52.6	52.6	10.397	4.24	0 35.35	46.66	8.96	5 42 19.06
18	5 47 3.98	4.12	23 25 22.1	22.1	10.399	3.21	0 48.37	46.59	8.97	5 46 15.62
19	5 51 13.62	13.79	23 26 26.8	26.8	10.401	2.17	1 1.45	46.53	8.98	5 50 12.18
20	5 55 23.28	23.49	23 27 6.6	6.6	10.401	1.14	1 14.55	46.47	8.98	5 54 8.74
21	5 59 32.94	33.19	23 27 21.5	21.5	10.401	+0.10	1 27.66	46.42	8.98	5 58 5.29
22	6 3 42.56	42.85	23 27 11.6	11.6	10.398	-0.92	1 40.72	46.37	8.98	6 2 1.85
23	6 7 52.12	52.45	23 26 36.8	36.8	10.395	1.94	1 53.73	46.33	8.97	6 5 58.41
24	6 12 1.60	1.97	23 25 37.3	37.2	10.391	2.97	2 6.65	46.29	8.96	6 9 54.97
25	6 16 10.96	11.37	23 24 13.2	13.1	10.387	3.99	2 19.45	46.26	8.94	6 13 51.53
26	6 20 20.18	20.62	23 22 24.4	24.2	10.381	5.02	2 32.12	46.24	8.93	6 17 48.09
27	6 24 29.24	29.71	23 20 11.0	10.7	10.373	6.05	2 44.64	46.22	8.91	6 21 44.65
28	6 28 38.12	38.63	23 17 33.0	32.6	10.365	7.07	2 56.96	46.20	8.88	6 25 41.20
29	6 32 46.79	47.34	23 14 30.6	30.2	10.356	8.09	3 9.08	46.19	8.85	6 29 37.76
30	6 36 55.23	55.81	+23 11 3.8	3.3	10.346	-9.11	+3 20.95	15 46.18	1 8.82	6 33 34.32

NOTE.—For Mean interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly Motion. Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Appar- ent Noon.	Mean Noon.	Appar- ent Noon.	Right Ascension.	Declination.				
1879.										
July 1	<sup>h</sup> 6 <sup>m</sup> 41 <sup>s</sup> 3.43	<sup>s</sup> 4.04	<sup>°</sup> +23 <sup>'</sup> 7 <sup>"</sup> 12.7	<sup>"</sup> 12.1	<sup>s</sup> 10.336	<sup>"</sup> -10.13	<sup>m</sup> +3 <sup>s</sup> 32.58	<sup>'</sup> 15 <sup>"</sup> 46.17	<sup>m</sup> 1 <sup>s</sup> 8.79	<sup>h</sup> 6 <sup>m</sup> 37 <sup>s</sup> 30.88
2	6 45 11.36	12.00	23 2 57.4	56.7	10.324	11.14	3 43.94	46.17	8.75	6 41 27.44
3	6 49 19.01	19.68	22 58 18.0	17.2	10.312	12.14	3 55.05	46.17	8.71	6 45 23.99
4	6 53 26.37	27.07	22 53 14.6	13.7	10.300	13.14	4 5.86	46.17	8.67	6 49 20.55
5	6 57 33.42	34.15	22 47 47.2	46.2	10.287	14.13	4 16.35	46.18	8.62	6 53 17.11
6	7 1 40.13	40.89	22 41 56.1	54.9	10.273	15.12	4 26.50	46.19	8.57	6 57 13.67
7	7 5 46.50	47.29	22 35 41.3	40.0	10.258	16.10	4 36.31	46.21	8.52	7 1 10.23
8	7 9 52.51	53.32	22 29 3.1	1.7	10.243	17.08	4 45.76	46.23	8.47	7 5 6.79
9	7 13 58.14	58.97	22 22 1.5	0.0	10.226	18.05	4 54.83	46.25	8.41	7 9 3.34
10	7 18 3.38	4.23	22 14 36.7	35.1	10.209	19.01	5 3.51	46.28	8.35	7 12 59.90
11	7 22 8.21	9.09	22 6 48.9	47.2	10.192	19.96	5 11.78	46.31	8.29	7 16 56.46
12	7 26 12.62	13.52	21 58 38.2	36.3	10.174	20.91	5 19.63	46.34	8.23	7 20 53.02
13	7 30 16.59	17.50	21 50 4.8	2.8	10.156	21.86	5 27.05	46.38	8.16	7 24 49.58
14	7 34 20.11	21.04	21 41 8.9	6.8	10.137	22.79	5 34.01	46.42	8.10	7 28 46.14
15	7 38 23.16	24.11	21 31 50.7	48.5	10.117	23.72	5 40.50	46.47	8.03	7 32 42.60
16	7 42 25.72	26.68	21 22 10.4	8.0	10.097	24.63	5 46.50	46.52	7.96	7 36 39.25
17	7 46 27.77	28.74	21 12 8.3	5.8	10.075	25.54	5 52.00	46.58	7.89	7 40 35.80
18	7 50 29.30	30.29	21 1 44.6	42.0	10.053	26.43	5 56.97	46.64	7.81	7 44 32.36
19	7 54 30.30	31.30	20 50 59.5	56.8	10.030	27.32	6 1.41	46.72	7.73	7 48 28.92
20	7 58 30.75	31.76	20 39 53.3	50.5	10.007	28.19	6 5.30	46.80	7.65	7 52 25.48
21	8 2 30.64	31.66	20 28 26.3	23.4	9.983	29.05	6 8.63	46.88	7.57	7 56 22.03
22	8 6 29.96	30.99	20 16 38.7	35.7	9.959	29.90	6 11.39	46.96	7.49	8 0 18.59
23	8 10 28.69	29.72	20 4 30.8	27.7	9.934	30.75	6 13.56	47.05	7.41	8 4 15.15
24	8 14 26.82	27.85	19 51 62.8	59.5	9.909	31.59	6 15.13	47.13	7.33	8 8 11.71
25	8 18 24.35	25.38	19 39 15.0	11.6	9.884	32.40	6 16.09	47.25	7.24	8 12 8.26
26	8 22 21.27	22.30	19 26 7.7	4.3	9.859	33.21	6 16.45	47.35	7.16	8 16 4.82
27	8 26 17.58	18.61	19 12 41.1	37.6	9.833	34.00	6 16.20	47.47	7.07	8 20 1.37
28	8 30 13.27	14.29	18 58 55.6	52.0	9.807	34.78	6 15.34	47.59	6.99	8 23 57.93
29	8 34 8.35	9.36	18 44 51.4	47.7	9.782	35.55	6 13.86	47.71	6.90	8 27 54.49
30	8 38 2.81	3.81	18 30 28.8	25.1	9.756	36.31	6 11.76	47.83	6.82	8 31 51.05
31	8 41 56.66	57.65	18 15 48.0	44.2	9.731	37.07	6 9.05	47.95	6.73	8 35 47.60
Aug. 1	8 45 49.90	50.88	18 0 49.3	45.5	9.706	37.81	6 5.73	48.08	6.65	8 39 44.16
2	8 49 42.53	43.50	17 45 32.9	29.1	9.681	38.55	6 1.80	48.21	6.56	8 43 40.71
3	8 53 34.55	35.51	17 29 59.2	55.3	9.656	39.27	5 57.27	48.34	6.47	8 47 37.27
4	8 57 25.97	26.91	17 14 8.4	4.5	9.630	39.98	5 52.13	48.47	6.38	8 51 33.83
5	9 1 16.80	17.72	16 57 60.8	56.9	9.605	40.67	5 46.40	48.60	6.30	8 55 30.39
6	9 5 7.05	7.96	16 41 36.6	32.7	9.581	41.35	5 40.09	48.74	6.21	8 59 26.94
7	9 8 56.72	57.60	16 24 56.1	52.2	9.557	42.02	5 33.20	48.88	6.12	9 3 23.50
8	9 12 45.81	46.67	16 7 59.7	55.9	9.534	42.68	5 25.73	49.03	6.03	9 7 20.05
9	9 16 34.33	35.17	15 50 47.6	43.8	9.510	43.32	5 17.70	49.18	5.95	9 11 16.61
10	9 20 22.30	23.11	15 33 20.1	16.3	9.487	43.96	5 9.11	49.33	5.86	9 15 13.16
11	9 24 9.72	10.50	15 15 37.5	33.8	9.464	44.58	4 59.97	49.49	5.78	9 19 9.72
12	9 27 56.59	57.34	14 57 40.2	36.6	9.441	45.19	4 50.29	49.65	5.70	9 23 6.27
13	9 31 42.91	43.64	14 39 28.5	25.0	9.419	45.78	4 40.06	49.82	5.62	9 27 2.83
14	9 35 28.71	29.40	14 20 62.6	59.2	9.397	46.36	4 29.30	49.99	5.54	9 30 59.38
15	9 39 13.97	14.63	14 2 23.0	19.6	9.375	46.93	4 18.00	50.16	5.46	9 34 55.94
16	9 42 58.71	59.34	13 43 29.9	26.6	9.353	47.49	4 6.19	50.34	5.38	9 38 52.49
17	9 46 42.93	43.53	13 24 23.6	20.5	9.332	48.02	3 53.86	50.53	5.31	9 42 49.05
18	9 50 26.65	27.21	13 5 4.5	1.5	9.311	48.55	3 41.02	50.72	5.24	9 46 45.60
19	9 54 9.86	10.39	12 45 33.1	30.3	9.291	49.06	3 27.68	50.91	5.17	9 50 42.16
20	9 57 52.54	53.07	12 25 49.5	46.9	9.271	49.55	3 13.85	51.11	5.10	9 54 38.71
21	10 1 34.82	35.27	12 5 54.2	51.7	9.250	50.04	2 59.53	51.31	5.03	9 58 35.27
22	10 5 16.58	16.99	11 45 47.5	45.2	9.230	50.51	2 44.74	51.52	4.97	10 2 31.82
23	10 8 57.88	58.25	11 25 29.8	27.7	9.211	50.96	2 29.49	51.73	4.90	10 6 28.38
24	10 12 38.73	39.06	11 4 61.3	59.4	9.192	51.40	2 13.78	51.94	4.84	10 10 24.93
25	10 16 19.13	19.42	10 44 22.3	20.6	9.174	51.84	1 57.63	52.16	4.78	10 14 21.49
26	10 19 59.11	59.36	10 23 33.1	31.6	9.157	52.26	1 41.06	52.38	4.72	10 18 18.04
27	10 23 38.69	38.89	10 2 34.2	32.9	9.141	52.67	1 24.07	52.60	4.67	10 22 14.60
28	10 27 17.87	18.03	9 41 25.8	24.8	9.125	53.06	1 6.70	52.82	4.61	10 26 11.15
29	10 30 56.69	56.80	9 20 8.3	7.6	9.110	53.45	0 48.98	53.04	4.56	10 30 7.71
30	10 34 35.15	35.22	8 58 41.8	41.3	9.095	53.81	0 30.91	53.27	4.51	10 34 4.25
31	10 38 13.28	13.30	+ 8 37 6.7	6.5	9.082	-54.16	+0 12.48	15 53.50	1 4.46	10 38 0.81

NOTE.—For Mean interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.

# 328 SOLAR EPHEMERIS, 1879.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly Motion, Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
1879.	h m s	h m s	h m s	h m s	h m s	h m s	m s	m s	m s	h m s
Sept. 1	10 41 51.09	51.07	+ 8 15' 23.3	23.3	9.069	-54.50	- 0 6.26	15 53.63	1 4.41	10 41 57.26
2	10 45 28.61	28.54	7 53 32.0	32.4	9.058	54.82	0 25.30	53.96	4.37	10 45 53.92
3	10 49 5.85	5.73	7 31 32.8	33.6	9.047	55.12	0 44.61	54.19	4.33	10 49 50.47
4	10 52 42.84	42.67	7 9 26.2	27.3	9.037	55.42	1 4.16	54.42	4.29	10 53 47.03
5	10 56 19.59	19.37	6 47 12.6	14.0	9.027	55.71	1 23.96	54.66	4.25	10 57 43.58
6	10 59 56.13	55.86	6 24 52.2	53.9	9.019	55.99	1 43.98	54.90	4.21	11 1 40.14
7	11 3 32.48	32.16	6 2 25.3	27.3	9.012	56.25	2 4.18	55.14	4.18	11 5 36.68
8	11 7 8.66	8.29	5 39 52.2	54.6	9.005	56.50	2 24.54	55.38	4.16	11 9 33.24
9	11 10 44.69	44.27	5 17 13.3	16.0	8.999	56.74	2 45.06	55.62	4.14	11 13 29.79
10	11 14 20.58	20.11	4 54 28.0	31.9	8.994	56.95	3 5.72	55.86	4.12	11 17 26.35
11	11 17 56.36	55.84	4 31 39.4	42.8	8.989	57.16	3 26.49	56.11	4.10	11 21 22.89
12	11 21 32.04	31.47	4 8 45.1	48.8	8.985	57.36	3 47.35	56.36	4.08	11 25 19.45
13	11 25 7.64	7.02	3 45 46.2	50.2	8.982	57.54	4 8.29	56.61	4.07	11 29 16.00
14	11 28 43.17	42.49	3 22 43.3	47.7	8.980	57.70	4 29.30	56.87	4.06	11 33 12.56
15	11 32 18.65	17.92	2 59 36.7	41.5	8.978	57.85	4 50.37	57.13	4.05	11 37 9.11
16	11 35 54.10	53.31	2 36 26.6	31.7	8.977	57.98	5 11.48	57.39	4.05	11 41 5.67
17	11 39 29.53	28.69	2 13 13.6	19.1	8.976	58.09	5 32.60	57.65	4.05	11 45 2.22
18	11 43 4.96	4.07	1 49 58.0	63.9	8.976	58.20	5 53.71	57.92	4.05	11 48 58.78
19	11 46 40.41	39.47	1 26 40.0	46.2	8.977	58.29	6 14.80	58.19	4.06	11 52 55.32
20	11 50 15.89	14.89	1 3 20.0	26.5	8.980	58.36	6 35.86	58.46	4.07	11 56 51.88
21	11 53 51.43	50.38	0 39 58.4	65.3	8.983	58.42	6 56.88	58.73	4.08	12 0 48.43
22	11 57 27.04	25.94	+ 0 16 35.7	42.9	8.986	58.47	7 17.83	59.00	4.09	12 4 44.99
23	12 1 2.74	1.59	- 0 6 48.0	40.4	8.990	58.49	7 38.68	59.28	4.11	12 8 41.53
24	12 4 38.55	37.34	0 30 12.3	4.4	8.995	58.51	7 59.41	59.56	4.13	12 12 38.09
25	12 8 14.49	13.23	0 53 36.9	28.6	9.000	58.52	8 20.01	59.84	4.15	12 16 34.64
26	12 11 50.58	49.27	1 16 61.3	52.7	9.007	58.51	8 40.48	16 0.12	4.18	12 20 31.20
27	12 15 26.85	25.48	1 40 25.3	16.4	9.015	58.48	9 0.77	0.39	4.21	12 24 27.75
28	12 19 3.32	1.90	2 3 48.5	39.3	9.024	58.45	9 20.85	0.67	4.24	12 28 24.31
29	12 22 40.01	38.54	2 27 10.7	1.2	9.033	58.40	9 40.70	0.95	4.28	12 32 20.85
30	12 26 16.95	15.43	2 50 31.5	21.7	9.044	58.33	10 0.31	1.23	4.32	12 36 17.41
Oct. 1	12 29 54.15	52.58	3 13 50.6	40.5	9.056	58.25	10 19.66	1.50	4.36	12 40 13.96
2	12 33 31.65	30.03	3 36 67.7	57.3	9.069	58.16	10 38.71	1.78	4.41	12 44 10.52
3	12 37 9.46	7.79	4 0 22.3	11.7	9.082	58.05	10 57.45	2.05	4.46	12 48 7.07
4	12 40 47.62	45.90	4 23 34.2	23.3	9.097	57.93	11 15.85	2.32	4.51	12 52 3.63
5	12 44 26.14	24.37	4 46 43.1	31.9	9.113	57.80	11 33.89	2.59	4.56	12 56 0.18
6	12 48 5.05	3.23	5 9 48.6	37.2	9.130	57.65	11 51.53	2.87	4.61	12 59 56.73
7	12 51 44.36	42.50	5 32 50.2	38.6	9.147	57.48	12 8.76	3.14	4.67	13 3 53.28
8	12 55 24.11	22.20	5 55 47.7	35.9	9.165	57.30	12 25.58	3.42	4.73	13 7 49.84
9	12 59 4.30	2.34	6 18 40.7	28.7	9.184	57.11	12 41.94	3.69	4.80	13 11 46.39
10	13 2 44.96	42.96	6 41 28.9	16.7	9.204	56.89	12 57.84	3.96	4.87	13 15 42.95
11	13 6 26.11	24.07	7 3 71.7	59.2	9.225	56.66	13 13.24	4.23	4.94	13 19 39.49
12	13 10 7.76	5.68	7 26 48.8	36.1	9.247	56.42	13 28.14	4.51	5.01	13 23 36.05
13	13 13 49.93	47.80	7 49 19.8	6.9	9.269	56.15	13 42.53	4.78	5.09	13 27 32.60
14	13 17 32.63	30.46	8 11 44.3	31.3	9.291	55.88	13 56.39	5.05	5.17	13 31 29.16
15	13 21 15.88	13.67	8 33 61.9	48.8	9.314	55.58	14 9.70	5.32	5.25	13 35 25.71
16	13 24 59.69	57.44	8 55 72.2	59.0	9.338	55.27	14 22.44	5.60	5.33	13 39 22.27
17	13 28 44.08	41.90	9 18 14.8	1.5	9.362	54.95	14 34.60	5.87	5.42	13 43 18.82
18	13 32 29.07	26.75	9 39 69.4	56.0	9.387	54.59	14 46.17	6.15	5.51	13 47 15.38
19	13 36 14.66	12.30	10 1 55.3	41.8	9.413	54.23	14 57.14	6.42	5.60	13 51 11.92
20	13 39 60.87	58.48	10 23 32.4	18.7	9.439	53.85	15 7.50	6.70	5.69	13 55 8.48
21	13 43 47.70	45.28	10 44 60.1	46.4	9.465	53.45	15 17.23	6.97	5.79	13 59 5.03
22	13 47 35.18	32.73	11 6 18.2	4.5	9.492	53.04	15 26.31	7.24	5.89	14 3 1.59
23	13 51 23.32	20.84	11 27 26.1	12.4	9.520	52.61	15 34.73	7.51	5.99	14 6 58.14
24	13 55 12.13	9.62	11 48 23.5	9.8	9.548	52.16	15 42.48	7.78	6.09	14 10 54.70
25	13 58 61.63	59.10	12 8 70.1	56.6	9.577	51.71	15 49.54	8.05	6.19	14 14 51.25
26	14 2 51.83	49.28	12 29 45.4	31.8	9.607	51.24	15 55.89	8.32	6.29	14 18 47.81
27	14 6 42.76	40.19	12 49 69.2	55.7	9.638	50.74	16 1.53	8.58	6.40	14 22 44.36
28	14 10 34.42	31.83	13 10 20.9	7.4	9.669	50.23	16 6.45	8.84	6.51	14 26 40.92
29	14 14 26.83	24.22	13 30 20.2	6.8	9.700	49.70	16 10.60	9.10	6.62	14 30 37.47
30	14 18 20.00	17.37	13 49 66.8	53.5	9.732	49.16	16 13.99	9.35	6.73	14 34 34.03
31	14 22 13.96	11.31	-14 9 40.2	27.1	9.765	-48.61	-16 16.59	16 9.60	1 6.84	14 38 30.58

NOTE.—For Mean Interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly Motion. Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
1879.	h m s	s	h m s	s	s	'	m s	'	m s	h m s
Nov. 1	14 26 8.71	6.05	14 26 60.0	46.9	9.798	-48.04	16 18.40	16 9.85	6.95	14 42 37.14
2	14 30 4.27	1.60	14 47 65.8	52.9	9.832	47.44	16 19.40	10.03	7.07	14 46 33.69
3	14 33 60.65	57.97	15 6 57.3	44.6	9.866	46.84	16 19.59	10.33	7.18	14 50 30.25
4	14 37 57.86	55.17	15 25 34.0	21.4	9.901	46.22	16 18.95	10.57	7.30	14 54 26.80
5	14 41 55.91	53.22	15 43 55.6	43.3	9.936	45.57	16 17.46	10.81	7.42	14 58 13.36
6	14 45 54.82	52.12	16 1 61.6	49.5	9.971	44.92	16 15.12	11.04	7.54	15 2 9.91
7	14 49 54.58	51.88	16 19 51.6	39.7	10.008	44.24	16 11.92	11.27	7.66	15 6 6.47
8	14 53 55.20	52.50	16 37 25.2	13.5	10.044	43.55	16 7.86	11.50	7.78	15 10 3.02
9	14 57 56.68	53.99	16 54 42.0	30.5	10.080	42.84	16 2.94	11.73	7.90	15 13 59.58
10	15 1 59.03	56.34	17 11 41.6	30.4	10.116	42.12	15 57.16	11.95	8.02	15 17 56.13
11	15 5 62.24	59.56	17 28 23.5	12.6	10.152	41.38	15 50.51	12.17	8.14	15 21 52.69
12	15 10 6.31	3.64	17 44 47.3	36.7	10.188	40.61	15 43.00	12.39	8.26	15 25 49.24
13	15 14 11.24	8.58	18 0 52.6	42.4	10.223	39.82	15 34.64	12.60	8.38	15 29 45.80
14	15 18 17.01	14.37	18 16 39.0	29.1	10.258	39.03	15 25.43	12.81	8.50	15 33 42.36
15	15 22 23.63	21.01	18 31 66.1	56.5	10.293	38.21	15 15.39	13.03	8.62	15 37 38.92
16	15 26 31.08	28.49	18 47 13.5	4.3	10.327	37.39	15 4.50	13.24	8.74	15 41 35.47
17	15 30 39.37	36.81	19 1 60.8	51.9	10.362	36.55	14 52.78	13.45	8.85	15 45 32.03
18	15 34 48.48	45.95	19 16 27.6	19.0	10.396	35.68	14 40.24	13.66	8.96	15 49 28.58
19	15 38 58.40	55.90	19 30 33.5	25.2	10.430	34.80	14 26.88	13.87	9.08	15 53 25.14
20	15 43 9.13	6.67	19 44 18.3	10.3	10.463	33.91	14 12.71	14.07	9.19	15 57 21.70
21	15 47 20.65	18.22	19 57 41.4	33.8	10.496	33.01	13 57.75	14.27	9.30	16 1 18.26
22	15 51 32.95	30.56	20 10 42.6	35.3	10.528	32.09	13 42.01	14.46	9.41	16 5 14.81
23	15 55 46.01	43.66	20 23 21.5	14.6	10.560	31.15	13 25.51	14.65	9.52	16 9 11.37
24	15 59 59.83	57.52	20 35 37.8	31.3	10.591	30.19	13 8.26	14.84	9.63	16 13 7.92
25	16 4 14.40	12.13	20 47 31.1	25.0	10.622	29.23	12 50.25	15.02	9.73	16 17 4.48
26	16 8 29.70	27.48	20 58 61.1	55.3	10.652	28.26	12 31.49	15.20	9.83	16 21 1.04
27	16 12 45.72	43.56	21 10 7.5	2.0	10.682	27.27	12 12.02	15.37	9.93	16 24 57.60
28	16 17 2.46	0.36	21 20 50.1	44.9	10.711	26.27	11 51.85	15.53	10.03	16 28 54.15
29	16 21 19.90	17.85	21 31 8.4	3.6	10.740	25.25	11 30.98	15.69	10.13	16 32 50.71
30	16 25 38.02	36.03	21 40 62.2	57.8	10.769	24.22	11 9.42	15.84	10.22	16 36 47.27
Dec. 1	16 29 56.82	54.89	21 50 31.2	27.1	10.797	23.18	10 47.18	15.99	10.31	16 40 43.83
2	16 34 16.27	14.40	21 59 35.0	31.3	10.824	22.13	10 24.27	16.14	10.40	16 44 40.38
3	16 38 36.36	34.56	22 8 13.5	10.1	10.849	21.08	10 0.74	16.28	10.48	16 48 36.94
4	16 42 57.06	53.33	22 16 26.4	23.3	10.874	20.00	9 36.59	16.41	10.56	16 52 33.50
5	16 47 18.35	16.69	22 24 13.5	10.7	10.898	18.92	9 11.86	16.54	10.63	16 56 30.06
6	16 51 40.21	38.63	22 31 34.4	31.9	10.922	17.82	8 46.57	16.67	10.70	17 0 26.62
7	16 56 2.60	1.10	22 38 28.7	26.5	10.943	16.71	8 20.73	16.79	10.77	17 4 23.18
8	17 0 25.50	24.08	22 44 56.3	54.4	10.964	15.59	7 54.37	16.91	10.83	17 8 19.73
9	17 4 48.89	47.55	22 50 57.2	55.4	10.983	14.47	7 27.54	17.00	10.89	17 12 16.29
10	17 9 12.74	11.48	22 56 31.1	29.5	11.002	13.34	7 0.25	17.12	10.95	17 16 12.85
11	17 13 37.01	35.84	23 1 37.7	36.4	11.019	12.21	6 32.54	17.22	11.01	17 20 9.41
12	17 18 1.65	0.56	23 6 16.9	15.8	11.034	11.07	6 4.44	17.33	11.06	17 24 5.96
13	17 22 26.64	25.63	23 10 28.6	27.7	11.048	9.92	5 35.99	17.43	11.11	17 28 2.52
14	17 26 51.96	51.03	23 14 12.5	11.8	11.061	8.75	5 7.22	17.53	11.15	17 31 59.08
15	17 31 17.56	16.72	23 17 28.6	28.1	11.072	7.58	4 38.17	17.62	11.18	17 35 55.64
16	17 35 43.40	42.65	23 20 16.7	16.3	11.081	6.41	4 8.88	17.71	11.21	17 39 52.20
17	17 40 9.44	8.78	23 22 36.8	36.5	11.088	5.25	3 39.39	17.79	11.23	17 43 48.76
18	17 44 35.64	35.07	23 24 28.8	28.6	11.095	4.08	3 9.73	17.87	11.25	17 47 45.31
19	17 49 1.97	1.50	23 25 52.6	52.4	11.099	2.91	2 39.95	17.94	11.27	17 51 41.87
20	17 53 28.39	28.01	23 26 48.2	48.1	11.102	1.73	2 10.07	18.01	11.28	17 55 38.43
21	17 57 54.88	54.59	23 27 15.6	15.6	11.103	-0.56	1 40.14	18.08	11.29	17 59 34.99
22	18 2 21.38	21.18	23 27 14.7	14.7	11.104	+0.62	1 10.19	18.14	11.30	18 3 31.55
23	18 6 47.89	47.78	23 26 45.6	45.6	11.103	1.80	0 40.24	18.19	11.30	18 7 28.11
24	18 11 14.35	14.33	23 25 48.2	48.2	11.100	2.98	-0 10.32	18.24	11.30	18 11 24.66
25	18 15 40.73	40.81	23 24 22.6	22.6	11.099	4.16	+0 19.52	18.29	11.29	18 15 21.22
26	18 20 7.00	7.17	23 22 28.8	28.7	11.092	5.33	0 49.24	18.33	11.28	18 19 17.78
27	18 24 33.15	33.41	23 20 6.9	6.7	11.086	6.50	1 18.84	18.35	11.26	18 23 14.34
28	18 28 59.13	59.48	23 17 16.9	16.6	11.079	7.66	1 48.27	18.37	11.24	18 27 10.90
29	18 33 24.92	25.36	23 13 58.9	58.5	11.071	8.82	2 17.52	18.39	11.21	18 31 7.46
30	18 37 50.50	51.03	23 10 13.0	12.5	11.061	9.98	2 46.55	18.41	11.18	18 35 4.01
31	18 42 15.83	16.45	23 5 59.3	58.7	11.050	11.14	3 15.32	18.41	11.14	18 39 0.57
32	18 46 40.88	41.59	23 1 17.8	17.0	11.037	+12.30	+3 43.80	16 18.41	11.09	18 42 57.13

NOTE.—For Mean Interval of Semidiameter passing the Meridian, subtract 0.19 from the Sidereal Interval.

## WASHINGTON MERIDIAN.

Date. 1879.	Mean Time of Meridian Transit.	Diff. for 1 h. of Long.	Sidereal Time of Semid. passing Merid.	Stars	Bright Limb.	Date. 1879.	Mean Time of Meridian Transit.	Diff. for 1 h. of Long.	Sidereal Time of Semid. passing Merid.	Stars	Bright Limb.
Jan. 1	h m 6 45.96	m 1.778	s 63.36	9 .. 16	I.	Mar. 1	h m 6 30.51	m 2.210	s 70.31	35 .. 41	I.
2	7 29.96	1.894	65.23	15 .. 21	I.	2	7 24.29	2.263	71.05	42 .. 51	I.
3	8 17.07	2.034	67.41	22 .. 28	I.	3	8 18.75	2.266	71.05	51 .. 59	I.
4	9 7.60	2.174	69.53	30 .. 34	I.	4	9 12.79	2.232	70.45	60 .. 66	I.
5	10 1.19	2.284	71.13	35 .. 41	I.	5	10 5.74	2.180	69.57	67 .. 72	I.
6	10 56.76	2.333	71.84	41 .. 50	I.	6	10 57.50	2.137	68.86	72 .. 83	I.
7	11 52.66	2.313	71.50	51 .. 59	I.	7	11 48.54	2.123	68.61	83 .. 94	I.
8	12 47.40	2.240	70.39	60 .. 66	II.	8	12 39.70	2.149	69.02	93 .. 100	II.
9	13 40.02	2.144	68.96	67 .. 72	II.	9	13 32.01	2.218	70.10	100 .. 110	II.
10	14 30.41	2.060	67.69	72 .. 82	II.	10	14 26.42	2.321	71.71	109 .. 118	II.
11	15 19.15	2.010	66.96	82 .. 92	II.	11	15 23.44	2.431	73.41	119 .. 126	II.
12	16 7.23	2.007	66.98	90 .. 100	II.	12	16 22.85	2.510	74.65	127 .. 136	II.
13	16 55.89	2.057	67.81	100 .. 106	II.	13	17 23.38	2.520	74.84	137 .. 143	II.
14	17 46.32	2.155	69.35	107 .. 116	II.	14	18 23.17	2.446	73.77	145 .. 153	II.
15	18 39.55	2.288	71.36	117 .. 122	II.	15	19 20.30	2.306	71.65	150 .. 161	II.
16	19 36.03	2.418	73.29	123 .. 131	II.	16	20 13.65	2.138	69.02	161 .. 167	II.
17	20 35.26	2.505	74.53	133 .. 140	II.	17	21 2.95	1.975	66.38	167 .. 174	II.
18	21 35.65	2.509	74.52		II.	18	21 48.69	1.843	64.15		II.
19	22 35.01	2.420	73.12		II.	19	22 31.69	1.748	62.51		II.
20	23 31.32	2.265	70.77		II.	20	23 12.91	1.695	61.56		II.
22	0 23.53	2.089	68.04		I.	21	23 53.36	1.683	61.32		II.
23	1 11.60	1.925	65.46		I.	23	0 33.97	1.707	61.76		I.
24	1 56.19	1.799	63.44		I.	24	1 15.57	1.765	62.77		I.
25	2 38.28	1.717	62.12	188 .. 198	I.	25	1 58.90	1.851	64.25		I.
26	3 18.95	1.681	61.58	196 .. 1	I.	26	2 44.52	1.953	65.97	20 .. 26	I.
27	3 59.31	1.690	61.80	1 .. 6	I.	27	3 32.63	2.055	67.68	25 .. 33	I.
28	4 40.40	1.741	62.73	5 .. 13	I.	28	4 23.04	2.140	69.09	33 .. 39	I.
29	5 23.18	1.831	64.26	11 .. 19	I.	29	5 15.12	2.192	69.93	38 .. 47	I.
30	6 8.50	1.951	66.23	19 .. 24	I.	30	6 7.95	2.203	70.10	48 .. 56	I.
31	6 56.92	2.085	68.34	24 .. 30	I.	31	7 0.58	2.178	69.71	56 .. 63	I.
Feb. 1	7 48.51	2.210	70.22	31 .. 37	I.	Apr. 1	7 52.38	2.138	69.03	63 .. 70	I.
2	8 42.69	2.296	71.48	38 .. 46	I.	2	8 43.23	2.103	68.42	71 .. 78	I.
3	9 38.29	2.325	71.83	46 .. 54	I.	3	9 33.52	2.094	68.22	77 .. 87	I.
4	10 33.84	2.295	71.31	55 .. 62	I.	4	10 24.05	2.125	68.64	87 .. 98	I.
5	11 28.15	2.226	70.22	63 .. 70	I.	5	11 15.87	2.203	69.80	98 .. 104	I.
6	12 20.62	2.148	69.03	71 .. 78	I.	6	12 10.09	2.322	71.57	105 .. 115	II.
7	13 11.43	2.092	68.17	78 .. 88	II.	7	13 7.46	2.460	73.66	116 .. 120	II.
8	14 1.31	2.073	67.89	88 .. 98	II.	8	14 8.02	2.578	75.44	121 .. 130	II.
9	14 51.27	2.099	68.36	98 .. 106	II.	9	15 10.68	2.625	76.18	132 .. 140	II.
10	15 42.41	2.170	69.53	105 .. 114	II.	10	16 13.25	2.569	75.45	141 .. 147	II.
11	16 35.69	2.274	71.18	115 .. 119	II.	11	17 13.32	2.423	73.35	148 .. 157	II.
12	17 31.59	2.384	72.86	120 .. 128	II.	12	18 9.21	2.232	70.46	158 .. 165	II.
13	18 29.87	2.463	74.03	129 .. 138	II.	13	19 0.44	2.041	67.51	166 .. 172	II.
14	19 29.29	2.474	74.16	140 .. 145	II.	14	19 47.41	1.881	64.90	171 .. 181	II.
15	20 28.01	2.404	73.06	146 .. 152	II.	15	20 31.07	1.766	62.94	178 .. 189	II.
16	21 24.21	2.272	71.00	153 .. 164	II.	16	21 12.55	1.698	61.71	188 .. 197	II.
17	22 16.79	2.110	68.44		II.	17	21 52.93	1.673	61.22		II.
18	23 5.54	1.957	65.95		II.	18	22 33.20	1.689	61.45		II.
19	23 50.90	1.830	63.87		II.	19	23 14.30	1.742	62.30		II.
21	0 33.68	1.742	62.40		I.	20	23 57.04	1.824	63.64		II.
22	1 14.83	1.695	61.64		I.	22	0 41.97	1.923	65.27		I.
23	1 55.36	1.690	61.59		I.	23	1 29.35	2.025	66.95		I.
24	2 36.23	1.722	62.21	2 .. 9	I.	24	2 19.02	2.110	68.35		I.
25	3 18.29	1.790	63.43	10 .. 18	I.	25	3 10.35	2.160	69.20	36 .. 44	I.
26	4 2.39	1.888	65.10	16 .. 22	I.	26	4 2.36	2.166	69.37	44 .. 53	I.
27	4 49.04	2.002	67.01	22 .. 29	I.	27	4 54.06	2.136	68.96	53 .. 60	I.
28	5 38.50	2.117	68.87	29 .. 34	I.	28	5 44.75	2.087	68.20	61 .. 68	I.
29	6 30.51	2.210	70.31	35 .. 41	I.	29	6 34.25	2.041	67.47	67 .. 73	I.
						30	7 22.88	2.018	67.09	73 .. 83	I.
						31	8 11.44	2.036	67.33	83 .. 93	I.

NOTE.—The numbers in the columns of Stars indicate those Stars in the Catalogue on pp. 333-336, which are within 30° of the Moon in right ascension. The nearest in declination, if sufficiently bright to be observed, are preferable.

# MOON-CULMINATIONS, 1879. 331

WASHINGTON MERIDIAN.											
Date. 1879.	Mean Time of Meridian Transit.	Diff. for 1 h. of Long.	Sidereal Time of Semid. passing Merid.	Stars.	Bright Limb.	Date. 1879.	Mean Time of Meridian Transit.	Diff. for 1 h. of Long.	Sidereal Time of Semid. passing Merid.	Stars.	Bright Limb.
May 1	h m	m	s			July 1	h m	m	s		
2	8 11.44	2.036	67.33	83 .. 93	I.	2	10 18.85	2.658	76.43	139 .. 144	I.
3	9 1.02	2.105	68.33	93 .. 100	I.	3	11 22.32	2.607	75.66	145 .. 151	I.
4	9 52.86	2.225	70.12	100 .. 108	I.	4	12 23.24	2.455	73.46	153 .. 164	II.
5	10 48.10	2.385	72.50	109 .. 118	I.	5	13 19.77	2.254	70.47	165 .. 170	II.
6	11 47.40	2.554	74.95	119 .. 126	I.	6	14 11.47	2.060	67.51	170 .. 177	II.
7	12 50.32	2.675	76.71	127 .. 136	II.	7	14 58.90	1.901	65.05	176 .. 187	II.
8	13 55.02	2.692	76.98	139 .. 144	II.	8	15 43.12	1.793	63.34	187 .. 197	II.
9	14 58.62	2.586	75.54	145 .. 150	II.	9	16 25.36	1.735	62.43	194 .. 203	II.
10	15 58.50	2.394	72.78	153 .. 164	II.	10	17 6.78	1.725	62.29	203 .. 5	II.
11	16 53.33	2.177	69.55	164 .. 169	II.	11	17 48.50	1.758	62.86	4 .. 12	II.
12	17 43.13	1.980	66.51	168 .. 176	II.	12	18 31.48	1.827	64.01	10 .. 18	II.
13	18 28.73	1.829	64.06	176 .. 187	II.	13	19 16.48	1.926	65.56	19 .. 23	II.
14	19 11.34	1.731	62.31	184 .. 194	II.	14	20 4.00	2.034	67.24	23 .. 30	II.
15	19 52.21	1.683	61.52	192 .. 203	II.	15	20 54.03	2.131	68.71	30 .. 35	II.
16	20 32.49	1.681	61.43	201 .. 3	II.	16	21 46.04	2.195	69.62	36 .. 44	II.
17	21 13.23	1.721	62.05	2 .. 9	II.	17	22 39.01	2.209	69.78		II.
18	21 55.36	1.795	63.24		II.	18	23 31.71	2.175	69.22		II.
19	22 39.59	1.894	64.80		II.	19	0 23.16	2.109	68.19		I.
20	23 26.34	2.002	66.49		II.	20	1 12.91	2.037	67.08		I.
21	0 15.59	2.097	67.99		I.	21	2 1.08	1.982	66.26		I.
22	1 6.75	2.159	68.99		I.	22	2 48.32	1.962	65.98	82 .. 93	I.
23	1 58.86	2.174	69.25		I.	23	3 35.58	1.985	66.41	92 .. 99	I.
24	2 50.73	2.142	68.83	50 .. 59	I.	24	4 23.97	2.058	67.61	100 .. 107	I.
25	3 41.44	2.081	67.94	60 .. 65	I.	25	5 14.70	2.177	69.48	107 .. 116	I.
26	4 30.57	2.016	66.97	65 .. 71	I.	26	6 8.69	2.325	71.75	117 .. 123	I.
27	5 18.34	1.969	66.26	72 .. 80	I.	27	7 6.28	2.471	73.88	123 .. 132	I.
28	6 5.36	1.958	66.10	79 .. 88	I.	28	8 6.88	2.565	75.20	134 .. 140	I.
29	6 52.71	1.996	66.69	88 .. 98	I.	29	9 8.71	2.568	75.19	141 .. 147	I.
30	7 41.60	2.088	68.11	98 .. 104	I.	30	10 9.42	2.474	73.75	149 .. 158	I.
31	8 33.36	2.235	70.31	105 .. 115	I.	31	11 6.96	2.314	71.33	159 .. 166	I.
June 1	9 29.13	2.417	72.97	116 .. 119	I.	Aug. 1	12 0.33	2.136	68.60	166 .. 173	I.
2	10 29.30	2.593	75.49	121 .. 129	I.	2	12 49.58	1.976	66.10	173 .. 183	II.
3	11 33.05	2.700	77.00	131 .. 140	I.	3	13 35.45	1.854	64.18	183 .. 192	II.
4	12 38.01	2.696	76.81	141 .. 147	II.	4	14 18.94	1.778	62.97	190 .. 200	II.
5	13 41.08	2.550	74.90	148 .. 158	II.	5	15 1.18	1.748	62.52	199 .. 3	II.
6	14 39.87	2.343	71.89	159 .. 165	II.	6	15 43.20	1.760	62.79	2 .. 9	II.
7	15 33.42	2.125	68.64	166 .. 173	II.	7	16 25.95	1.808	63.67	9 .. 16	II.
8	16 22.10	1.940	65.78	173 .. 183	II.	8	17 10.23	1.887	64.98	15 .. 21	II.
9	17 6.92	1.805	63.63	182 .. 191	II.	9	17 56.64	1.983	66.53	22 .. 28	II.
10	17 49.19	1.725	62.30	189 .. 200	II.	10	18 45.41	2.080	68.05	27 .. 34	II.
11	18 30.16	1.696	61.80	198 .. 1	II.	11	19 36.32	2.157	69.20	34 .. 40	II.
12	19 10.98	1.713	62.05	1 .. 9	II.	12	20 28.65	2.196	69.75	40 .. 48	II.
13	19 52.70	1.770	62.96	6 .. 15	II.	13	21 21.39	2.192	69.60	50 .. 59	II.
14	20 36.20	1.860	64.39	13 .. 21	II.	14	22 13.53	2.152	68.92		II.
15	21 22.13	1.969	66.07	20 .. 24	II.	15	23 4.56	2.094	67.98		II.
16	22 10.68	2.076	67.73		II.	16	23 54.16	2.043	67.14		II.
17	23 1.57	2.158	68.97		II.	17	0 42.79	2.015	66.71		I.
18	23 53.94	2.195	69.52		II.	18	1 31.16	2.025	66.90		I.
19	0 46.55	2.180	69.27		I.	19	2 20.31	2.078	67.80		I.
20	1 38.25	2.122	68.42		I.	20	3 11.23	2.173	69.32	106 .. 115	I.
21	2 28.29	2.047	67.31	63 .. 70	I.	21	4 4.82	2.297	71.27	115 .. 120	I.
22	3 16.57	1.980	66.30	71 .. 78	I.	22	5 1.51	2.423	73.20	120 .. 128	I.
23	4 3.53	1.940	65.73	76 .. 86	I.	23	6 0.86	2.512	74.49	129 .. 139	I.
24	4 50.04	1.944	65.82	85 .. 97	I.	24	7 1.53	2.527	74.69	140 .. 145	I.
25	5 37.24	1.999	66.72	96 .. 100	I.	25	8 1.49	2.455	73.59	146 .. 154	I.
26	6 26.40	2.107	68.43	101 .. 111	I.	26	8 58.87	2.319	71.50	155 .. 164	I.
27	7 18.74	2.262	70.77	111 .. 119	I.	27	9 52.58	2.157	68.96	165 .. 170	I.
28	8 15.13	2.439	73.35	120 .. 126	I.	28	10 42.45	2.005	66.51	171 .. 181	I.
29	9 15.61	2.591	75.51	127 .. 136	I.	29	11 20.03	1.883	64.55	177 .. 188	I.
30	10 18.85	2.658	76.43	139 .. 144	I.	30	12 13.16	1.802	63.23	188 .. 197	II.

NOTE.—The numbers in the columns of Stars indicate those Stars in the Catalogue on pp. 333-336, which are within 30" of the Moon in right ascension. The nearest in declination, if sufficiently bright to be observed, are preferable.

## WASHINGTON MERIDIAN.

Date. 1879.	Mean Time of Meridian Transit.	Diff. for 1 h. of Long.	Sidereal Time of Semid. passing Merid.	Stars	Bright Limb.	Date. 1879.	Mean Time of Meridian Transit.	Diff. for 1 h. of Long.	Sidereal Time of Semid. passing Merid.	Stars	Bright Limb.
Sept. 1	h m	m	s			Nov. 1	h m	m	s		
2	12 55.86	1.763	62.58	195 .. 1	II.	2	14 5.99	2.087	67.78	34 .. 39	II.
3	13 38.07	1.762	62.61	1 .. 6	II.	3	14 56.29	2.098	68.03	39 .. 48	II.
4	14 20.70	1.796	63.25	5 .. 13	II.	4	15 46.45	2.076	67.73	48 .. 56	II.
5	15 4.52	1.859	64.35	12 .. 20	II.	5	16 35.76	2.030	67.08	55 .. 62	II.
6	15 50.09	1.941	65.74	19 .. 24	II.	6	17 23.87	1.980	66.33	62 .. 70	II.
7	16 37.71	2.028	67.17	24 .. 31	II.	7	18 10.94	1.946	65.78	69 .. 75	II.
8	17 27.30	2.103	68.38	31 .. 37	II.	8	18 57.53	1.942	65.69	74 .. 85	II.
9	18 18.39	2.149	69.13	37 .. 45	II.	9	19 44.52	1.981	66.28	84 .. 95	II.
10	19 10.20	2.161	69.27	45 .. 54	II.	10	20 33.03	2.071	67.62	94 .. 100	II.
11	20 1.89	2.141	68.90	54 .. 61	II.	11	21 24.32	2.212	69.73	101 .. 112	II.
12	20 52.84	2.103	68.23	61 .. 68	II.	12	22 19.52	2.394	72.40		II.
13	21 42.82	2.064	67.55	69 .. 75	II.	13	23 19.25	2.581	75.09		II.
14	22 32.05	2.044	67.16		II.	14	0 22.97	2.713	76.99		I.
15	23 21.16	2.055	67.32		II.	15	1 28.65	2.733	77.30		I.
16	0 11.03	2.108	68.14		I.	16	2 33.21	2.625	75.84	146 .. 152	I.
17	1 2.67	2.202	69.60		I.	17	3 33.97	2.428	73.04	155 .. 164	I.
18	1 56.94	2.325	71.52		I.	18	4 29.58	2.209	69.78	165 .. 170	I.
19	2 54.29	2.452	73.46	120 .. 126	I.	19	5 20.17	2.015	66.85	171 .. 179	I.
20	3 54.34	2.542	74.83	127 .. 137	I.	20	6 6.67	1.870	64.52	177 .. 188	I.
21	4 55.73	2.557	75.12	139 .. 144	I.	21	6 50.34	1.778	62.98	188 .. 197	I.
22	5 56.43	2.484	74.04	145 .. 150	I.	22	7 32.43	1.737	62.25	194 .. 3	I.
23	6 54.46	2.343	71.95	151 .. 163	I.	23	8 14.06	1.740	62.25	1 .. 5	I.
24	7 48.70	2.176	69.35	163 .. 169	I.	24	8 56.26	1.783	62.89	5 .. 13	I.
25	8 38.96	2.017	66.81	168 .. 175	I.	25	9 39.84	1.853	63.99	11 .. 19	I.
26	9 25.75	1.889	64.70	176 .. 187	I.	26	10 25.31	1.938	65.31	19 .. 24	I.
27	10 9.96	1.802	63.22	184 .. 193	I.	27	11 12.85	2.021	66.58	24 .. 30	I.
28	10 52.58	1.757	62.42	192 .. 203	I.	28	12 2.17	2.083	67.55	31 .. 37	II.
29	11 34.60	1.751	62.30	201 .. 3	I.	29	12 52.54	2.107	67.95	36 .. 45	II.
30	12 16.91	1.780	62.78	3 .. 10	II.	30	13 42.98	2.089	67.72	45 .. 53	II.
Oct. 1	13 0.27	1.837	63.75	10 .. 18	II.	Dec. 1	14 32.57	2.038	67.00	53 .. 60	II.
2	13 45.23	1.911	65.02	17 .. 22	II.	2	15 20.72	1.974	66.06	61 .. 68	II.
3	14 32.07	1.991	66.37	23 .. 29	II.	3	16 7.40	1.918	65.20	67 .. 72	II.
4	15 20.73	2.060	67.56	30 .. 34	II.	4	16 52.97	1.886	64.73	72 .. 81	II.
5	16 10.78	2.105	68.35	35 .. 41	II.	5	17 38.21	1.892	64.86	81 .. 91	II.
6	17 1.53	2.117	68.53	42 .. 50	II.	6	18 24.17	1.947	65.75	89 .. 99	II.
7	17 52.19	2.100	68.28	50 .. 59	II.	7	19 12.11	2.055	67.46	99 .. 106	II.
8	18 42.18	2.064	67.70	60 .. 65	II.	8	20 3.32	2.220	69.92	105 .. 116	II.
9	19 31.26	2.028	67.09	65 .. 71	II.	9	20 58.95	2.421	72.85	117 .. 121	II.
10	20 19.65	2.009	66.74	71 .. 80	II.	10	21 59.45	2.616	75.61		II.
11	21 7.96	2.023	66.88	79 .. 89	II.	11	23 3.95	2.740	77.32		II.
12	21 57.08	2.078	67.68		II.	12	0 10.00	2.736	77.30		I.
13	22 48.03	2.178	69.16		II.	13	1 14.34	2.604	75.43		I.
14	23 41.95	2.319	71.30		II.	14	2 14.42	2.307	72.46	161 .. 167	I.
15	0 39.49	2.476	73.64		I.	15	3 9.28	2.179	69.25	167 .. 175	I.
16	1 40.59	2.606	75.57		I.	16	3 59.25	1.995	66.45	175 .. 186	I.
17	2 43.96	2.656	76.34	134 .. 140	I.	17	4 45.43	1.863	64.39	183 .. 193	I.
18	3 47.28	2.599	75.60	142 .. 147	I.	18	5 29.12	1.786	63.14	192 .. 202	I.
19	4 48.03	2.450	73.48	149 .. 158	I.	19	6 11.56	1.759	62.69	201 .. 3	I.
20	5 44.56	2.259	70.64	159 .. 166	I.	20	6 53.91	1.776	62.96	3 .. 10	I.
21	6 36.46	2.072	67.75	166 .. 173	I.	21	7 37.11	1.830	63.79	10 .. 18	I.
22	7 24.24	1.918	65.28	173 .. 182	I.	22	8 21.92	1.907	64.99	17 .. 22	I.
23	8 8.88	1.811	63.47	182 .. 191	I.	23	9 8.70	1.993	66.29	22 .. 29	I.
24	8 51.53	1.750	62.39	190 .. 200	I.	24	9 57.47	2.068	67.41	30 .. 34	I.
25	9 33.25	1.733	62.03	198 .. 2	I.	25	10 47.72	2.113	68.05	35 .. 41	I.
26	10 15.04	1.756	62.35	1 .. 9	I.	26	11 38.57	2.116	68.07	42 .. 50	I.
27	10 57.77	1.810	63.22	7 .. 15	I.	27	12 28.97	2.078	67.48	50 .. 59	II.
28	11 42.07	1.884	64.44	14 .. 18	II.	28	13 18.11	2.013	66.52	59 .. 65	II.
29	12 28.27	1.966	65.77	21 .. 26	II.	29	14 5.64	1.947	65.48	64 .. 71	II.
30	13 16.39	2.040	66.96	25 .. 33	II.	30	14 51.66	1.833	64.68	71 .. 80	II.
31	14 5.99	2.087	67.78	34 .. 39	II.	31	15 36.73	1.870	64.35	77 .. 87	II.

NOTE.—The numbers in the columns of Stars indicate those Stars in the Catalogue on pp. 333-336, which are within 30° of the Moon in right ascension. The nearest in declination, if sufficiently bright to be observed, are preferable.

## MEAN PLACES FOR 1879.0.

No.	Star's Name.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
1	36 Piscium . . .	6	<sup>l</sup> <sub>6</sub> <sup>m</sup> <sub>10</sub> <sup>s</sup> <sub>21.10</sub>	+3.078	+ 7° 34' 5.8"	+20.02
2	B. A. C. 113 . . .	6.7	0 23 55.51	3.083	4 11 26.7	19.94
3	51 Piscium . . .	6	0 26 9.29	3.092	6 17 14.4	20.00
4	58 Piscium . . .	5	0 40 42.74	3.120	11 18 49.1	19.74
5	δ Piscium . . .	4.5	0 42 24.23	3.105	6 55 33.9	19.66
6	ε Piscium . . .	4	0 56 39.86	+3.110	+ 7 14 18.4	+19.46
7	72 Piscium . . .	6	0 58 42.22	3.163	14 17 41.6	19.45
8	75 Piscium . . .	6	1 0 11.76	3.152	12 18 25.1	19.44
9	87 Piscium . . .	6	1 7 41.98	3.179	15 29 32.6	19.16
10	η Piscium . . .	4.3	1 25 0.52	3.201	14 43 18.6	18.71
11	B. A. C. 477 . . .	6	1 29 22.01	+3.233	+16 48 48.5	+18.55
12	105 Piscium . . .	6	1 33 9.15	3.225	15 47 28.3	18.39
13	4 Arietis . . .	6	1 41 87.23	3.246	16 21 9.4	18.16
14	γ Arietis (N'n star)	4.3	1 46 54.17	3.285	18 42 37.7	17.80
15	ι Arietis . . .	6	1 50 44.49	3.266	17 13 33.3	17.72
16	α ARIETIS . . .	2	2 0 21.27	+3.369	+22 53 22.9	+17.22
17	15 Arietis . . .	6.5	2 3 55.29	3.314	18 55 42.5	17.15
18	η Arietis . . .	5.6	2 6 1.69	3.345	20 38 30.0	17.11
19	26 Arietis . . .	6	2 23 51.32	3.345	19 19 2.0	16.20
20	ν Arietis . . .	6.5	2 31 56.79	3.394	21 26 13.8	15.78
21	μ Arietis . . .	6.5	2 35 32.71	+3.369	+19 29 41.0	+15.56
22	ε Arietis . . .	4.5	2 52 17.71	3.419	20 51 18.8	14.63
23	ζ ARIETIS . . .	4.5	3 7 56.90	3.438	20 35 42.7	13.62
24	64 Arietis . . .	6.5	3 17 9.79	3.528	24 17 39.2	13.02
25	7 Tauri . . .	6	3 27 16.74	3.542	24 3 24.7	12.33
26	9 Tauri . . .	6	3 29 51.15	+3.513	+22 48 33.4	+12.17
27	17 Tauri . . .	4	3 37 41.50	3.551	23 43 52.9	11.63
28	η TAURI . . .	3	3 40 17.58	3.555	23 43 46.7	11.43
29	B. A. C. 1192 . . .	6	3 43 2.62	3.593	25 12 42.0	11.03
30	41 Tauri . . .	5.6	3 59 11.25	3.674	27 16 20.4	10.09
31	φ Tauri . . .	5.6	4 12 54.70	+3.670	+27 3 34.6	+ 8.96
32	χ <sup>1</sup> Tauri . . .	6.5	4 15 13.19	3.642	25 20 31.1	8.81
33	υ <sup>1</sup> Tauri . . .	4.5	4 19 4.11	3.581	22 32 15.3	8.50
34	τ Tauri . . .	4.5	4 34 58.96	3.594	22 43 23.3	7.25
35	κ Tauri . . .	6.5	4 50 45.19	3.665	24 51 42.4	5.90
36	B. A. C. 1562 . . .	6.7	4 58 23.86	+3.698	+26 15 44.4	+ 5.36
37	103 Tauri . . .	6	5 0 44.26	3.650	24 6 13.2	5.17
38	B. A. C. 1648 . . .	6.7	5 13 23.65	3.765	27 49 56.6	3.98
39	β TAURI . . .	2	5 18 38.60	3.789	28 30 12.5	3.42
40	121 Tauri . . .	6	5 28 3.90	+3.666	+23 57 26.4	+ 2.76
41	125 Tauri . . .	6	5 32 14.24	3.714	25 49 39.7	2.40
42	132 Tauri . . .	5.6	5 41 35.41	3.684	24 31 29.1	1.59
43	136 Tauri . . .	5	5 45 43.42	3.769	27 34 53.1	1.18
44	139 Tauri . . .	5.6	5 50 29.24	+3.722	+25 56 13.0	+ 0.82
45	1 Geminorum . . .	5	5 56 45.88	3.645	23 16 4.9	+ 0.17
46	5 Geminorum . . .	6.7	6 4 7.09	3.680	24 26 41.5	- 0.44
47	η Geminorum . . .	3.4	6 7 34.40	3.620	22 32 24.4	0.68
48	μ GEMINORUM . . .	3	6 15 38.46	+3.633	+22 34 26.9	- 1.48
49	49 Aurigæ . . .	6.5	6 27 34.85	3.782	28 6 53.2	2.43
50	B. A. C. 2154 . . .	6.7	6 30 2.25	3.684	24 41 23.0	2.63
51	ε Geminorum . . .	3.4	6 36 29.20	+3.694	+25 14 57.4	- 3.19



# 334 MOON-CULMINATING STARS.

MEAN PLACES FOR 1879.0.						
No.	Star's Name.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
52	B. A. C. 2238 . .	6	<sup>h</sup> 6 <sup>m</sup> 44 <sup>s</sup> 39.87	+3.647	+23° 44' 36.0"	- 3.69
53	37 Geminorum . .	6.7	6 47 52.10	3.692	25 31 31.2	4.15
54	ω Geminorum . .	6	6 55 2.55	3.665	24 23 10.3	4.80
55	48 Geminorum . .	6	7 5 5.35	3.657	24 19 45.9	5.63
56	52 Geminorum . .	6.7	7 7 17.92	3.675	25 5 36.3	5.91
57	δ GEMINORUM . .	3.4	7 12 53.80	+3.590	+22 12 13.5	- 6.26
58	A Geminorum . .	5.6	7 16 5.97	3.670	25 16 53.1	6.56
59	63 Geminorum . .	5.6	7 20 33.37	3.568	21 41 27.9	7.00
60	κ Geminorum . .	4.3	7 37 8.44	3.627	24 41 10.9	8.30
61	85 Geminorum . .	6	7 48 36.16	3.511	20 12 6.7	9.19
62	μ <sup>2</sup> Cancri . . . .	6.5	8 0 38.62	+3.541	+21 55 53.0	-10.15
63	ζ <sup>1</sup> Cancri . . . .	4.5	8 5 16.26	3.447	18 0 40.8	10.53
64	B. A. C. 2788 . .	6	8 13 17.30	3.504	21 7 43.7	11.01
65	α <sup>2</sup> Cancri . . . .	6	8 18 55.96	3.405	17 26 37.2	11.57
66	η Cancri . . . .	6	8 25 42.58	3.477	20 51 2.8	11.97
67	γ Cancri . . . .	4.5	8 36 16.89	+3.479	+21 54 9.3	-12.63
68	δ Cancri . . . .	4	8 37 48.42	3.418	18 35 52.3	12.99
69	α <sup>2</sup> Cancri . . . .	6	8 50 49.62	3.355	16 2 41.1	13.56
70	α Cancri . . . .	4	8 51 52.06	3.287	12 19 30.1	13.71
71	π <sup>2</sup> Cancri . . . .	6	9 8 32.91	3.319	15 26 33.2	14.68
72	ξ Leonis . . . .	5.6	9 25 25.34	+3.239	+11 50 5.2	-15.74
73	ο Leonis . . . .	3.4	9 34 41.46	3.206	10 26 31.2	16.20
74	φ Leonis . . . .	6	9 37 8.50	3.275	14 34 26.6	16.29
75	B. A. C. 3345 . .	6	9 41 2.95	3.231	11 59 18.6	16.65
76	B. A. C. 3398 . .	6	9 50 1.14	3.187	9 30 20.9	16.89
77	ν Leonis . . . .	5	9 51 42.73	+3.232	+13 1 16.7	-17.01
78	π Leonis . . . .	5	9 53 48.60	3.176	8 37 26.4	17.11
79	A Leonis . . . .	5.4	10 1 28.91	3.188	10 35 24.0	17.49
80	α LEONIS . . . .	1.2	10 1 55.66	3.203	12 33 29.7	17.43
81	B. A. C. 3529 . .	6	10 14 12.38	3.144	7 2 21.1	17.96
82	44 Leonis . . . .	6	10 18 52.43	+3.160	+ 9 23 56.1	-18.25
83	ρ LEONIS . . . .	4	10 26 26.42	3.166	9 55 43.8	18.40
84	48 Leonis . . . .	6.5	10 28 29.27	3.134	7 34 33.7	18.42
85	34 Sextantis . . .	6	10 36 22.52	3.099	4 12 52.4	18.72
86	36 Sextantis . . .	6	10 38 55.37	3.091	3 7 26.7	18.82
87	B. A. C. 3726 . .	6	10 46 0.64	+3.083	+ 1 40 8.4	-19.02
88	d Leonis . . . .	5	10 54 18.62	3.098	4 15 59.7	19.27
89	p <sup>2</sup> Leonis . . . .	6.5	11 0 43.76	3.059	2 36 43.5	19.47
90	p <sup>2</sup> Leonis . . . .	5	11 7 33.97	3.076	0 35 18.8	19.53
91	B. A. C. 3836 . .	6	11 7 40.53	+3.087	+ 2 55 41.4	-19.53
92	φ Leonis . . . .	4.5	11 10 30.59	3.048	- 2 59 25.4	19.62
93	79 Leonis . . . .	6.5	11 17 49.76	3.080	+ 2 4 17.8	19.73
94	τ Lenois . . . .	5	11 21 42.81	3.085	+ 3 31 21.4	19.79
95	e Leonis . . . .	5	11 24 7.90	+3.063	- 2 20 10.1	-19.84
96	υ LEONIS . . . .	5.4	11 30 45.25	3.071	0 9 20.2	19.84
97	B. A. C. 3955 . .	6	11 32 13.43	3.075	1 46 1.6	19.95
98	B. A. C. 4006 . .	6	11 44 51.26	3.077	4 39 39.6	20.01
99	B. A. C. 4063 . .	6.7	11 57 24.42	+3.073	- 4 48 17.9	-20.05
100	14 Virginis . . . .	6.7	12 13 6.58	3.084	8 14 31.2	20.02
101	q Virginis . . . .	6	12 27 32.10	3.094	8 47 3.5	19.88
102	f Virginis . . . .	6	12 30 33.40	+3.084	- 5 9 54.8	-19.91

## MEAN PLACES FOR 1879.0.

No.	Star's Name.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
			<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
103	$\gamma$ Virginis . . .	5	12 33 0.06	+3.091	- 7 19' 45.8	-19.89
104	28 Virginis . . .	6.7	12 35 42.26	3.097	6 50 4.6	19.81
105	B. A. C. 4312 . . .	6.7	12 45 5.24	3.108	9 40 45.4	19.73
106	$\psi$ Virginis . . .	5	12 48 3.65	3.113	8 52 53.6	19.65
107	$g$ Virginis . . .	6	13 1 33.53	3.137	10 5 34.3	19.35
108	53 Virginis . . .	5	13 5 37.17	+3.180	-15 32 44.0	-19.54
109	B. A. C. 4441 . . .	6.7	13 11 6.26	3.180	14 54 24.5	19.10
110	58 Virginis . . .	6.7	13 11 6.90	3.138	9 54 29.0	19.08
111	$\alpha$ VIRGINIS . . .	1	13 18 49.22	3.154	10 31 44.2	18.89
112	$i$ Virginis . . .	6	13 20 19.65	3.161	12 4 39.8	18.87
113	69 Virginis . . .	5.6	13 20 59.99	+3.194	-15 20 47.3	-18.86
114	75 Virginis . . .	6	13 26 23.96	3.201	14 44 26.3	18.74
115	83 Virginis . . .	6	13 37 58.24	3.228	15 34 12.8	18.26
116	89 Virginis . . .	5	13 43 17.87	3.247	17 31 50.1	18.08
117	B. A. C. 4700 . . .	6	14 4 13.96	3.261	15 43 46.4	17.24
118	B. A. C. 4722 . . .	6	14 8 44.38	+3.307	-17 38 7.0	-16.98
119	B. A. C. 4739 . . .	6.7	14 11 56.32	3.309	18 9 14.4	16.82
120	B. A. C. 4888 . . .	6.7	14 42 19.61	3.453	23 44 46.8	15.23
121	12 Libræ . . .	6	14 47 18.70	3.474	24 8 45.6	14.97
122	B. A. C. 4923 . . .	6.7	14 50 24.07	3.485	20 52 6.2	16.53
123	$\gamma$ Scorpii . . .	3.4	14 56 59.29	+3.496	-24 48 18.5	-14.40
124	B. A. C. 4984 . . .	6.7	15 2 48.11	3.495	23 31 19.8	14.05
125	$\delta$ Libræ . . .	4.5	15 5 19.53	3.410	19 19 57.5	13.89
126	B. A. C. 5023 . . .	6.7	15 9 22.13	3.459	21 57 5.0	13.68
127	B. A. C. 5117 . . .	6.7	15 26 43.72	3.556	24 42 7.6	12.75
128	42 Libræ . . .	6.7	15 33 7.84	+3.534	-23 25 23.6	-12.01
129	$\delta$ Scorpii . . .	5	15 43 42.13	3.593	25 22 54.8	11.25
130	A <sup>3</sup> Scorpii . . .	5	15 46 20.92	3.592	24 57 52.1	11.04
131	$\pi$ Scorpii . . .	3	15 51 31.96	3.616	25 45 50.7	10.70
132	$\delta$ SCORPII . . .	2.3	15 53 10.82	3.538	22 16 30.9	10.54
133	B. A. C. 5347 . . .	6.5	16 0 45.28	+3.648	-26 0 5.1	-10.04
134	$\epsilon$ Scorpii . . .	5	16 4 51.32	3.689	27 36 38.1	9.67
135	19 Scorpii . . .	5.6	16 13 21.43	3.601	23 52 34.8	9.02
136	$\sigma$ Scorpii . . .	3.4	16 13 50.13	3.634	25 18 2.4	8.95
137	$\alpha$ SCORPII . . .	1.2	16 21 59.43	3.670	26 9 41.9	8.34
138	22 Scorpii . . .	5	16 22 51.48	+3.637	-24 50 48.9	- 8.26
139	$\tau$ Scorpii . . .	3.4	16 28 21.16	3.725	27 57 48.5	7.82
140	B. A. C. 5709 . . .	6	16 52 33.40	3.675	24 54 24.9	5.93
141	36 Ophiuchi . . .	5	17 7 54.42	3.682	26 25 21.8	5.64
142	$\eta$ Ophiuchi . . .	3.4	17 14 34.71	+3.677	-24 52 36.7	- 3.93
143	$b$ Ophiuchi . . .	5	17 18 58.86	3.658	24 3 44.2	3.69
144	$\epsilon$ Ophiuchi . . .	5	17 24 2.01	3.656	23 52 2.1	8.18
145	3 Sagittarii . . .	5	17 39 56.35	3.764	27 46 58.3	1.78
146	4 Sagittarii . . .	5	17 52 24.27	+3.656	-23 48 11.4	- 0.71
147	9 Sagittarii . . .	5.4	17 56 27.29	3.676	24 21 40.9	- 0.32
148	B. A. C. 6194 . . .	6	18 10 29.22	3.780	27 5 5.5	+ 0.85
149	$\lambda$ Sagittarii . . .	3	18 20 30.15	3.702	25 29 14.5	1.55
150	B. A. C. 6343 . . .	6	18 31 9.15	+3.653	-23 36 21.6	+ 2.74
151	B. A. C. 6369 . . .	6	18 37 23.23	3.691	25 7 49.7	3.25
152	$\varphi$ Sagittarii . . .	4.3	18 38 5.87	3.751	27 6 48.3	3.33
153	$\nu$ Sagittarii . . .	5	18 46 51.70	+3.621	-22 53 31.1	+ 4.06

## MEAN PLACES FOR 1879.0.

No.	Star's Name.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
154	$\sigma$ SAGITTARII . . .	2.3	<sup>h</sup> 18 <sup>m</sup> 47 <sup>s</sup> 54.73	+3.723	—26° 26' 41.6"	+ 4.09
155	B. A. C. 6490 . . .	6.7	18 55 3.33	3.678	25 0 39.4	4.77
156	$\circ$ Sagittarii . . .	4	18 57 25.81	3.594	21 55 1.4	4.93
157	$\pi$ Sagittarii . . .	3	19 2 33.99	3.568	21 12 51.5	5.37
158	$\psi$ Sagittarii . . .	6	19 8 7.13	3.681	25 27 48.2	5.87
159	$\chi^1$ Sagittarii . . .	6	19 17 54.60	+3.652	—24 44 28.6	+ 6.65
160	50 Sagittarii . . .	6	19 19 6.12	3.586	22 0 55.1	6.63
161	B. A. C. 6671 . . .	6	19 23 42.33	3.546	21 33 48.5	6.96
162	$\gamma^2$ Sagittarii . . .	5.4	19 29 20.48	3.654	25 8 56.3	7.64
163	53 Sagittarii . . .	6	19 32 33.10	3.618	23 42 3.9	7.99
164	$f$ Sagittarii . . .	5	19 39 18.12	+3.503	—20 3 1.5	+ 8.35
165	B. A. C. 6889 . . .	6.7	19 57 50.84	3.540	21 39 13.3	9.81
166	$\sigma$ Capricorni . . .	6.5	20 12 24.59	3.469	19 29 40.8	10.97
167	$\pi$ CAPRICORNI . . .	5	20 20 23.57	3.438	18 36 25.4	11.55
168	$\tau^2$ Capricorni . . .	5	20 32 30.25	3.359	15 22 40.7	12.35
169	$\nu$ Capricorni . . .	6.5	20 33 9.62	+3.425	—18 33 48.2	+ 12.44
170	B. A. C. 7202 . . .	6.7	20 41 32.29	3.414	18 38 35.8	13.00
171	21 Capricorni . . .	6	20 54 3.09	3.388	18 0 4.7	13.84
172	$\theta$ Capricorni . . .	4	20 59 8.60	3.379	17 42 44.7	14.08
173	29 Capricorni . . .	6	21 9 2.89	3.326	15 40 23.6	14.74
174	$\iota$ Capricorni . . .	4.5	21 15 30.42	+3.347	—17 20 55.5	+ 15.13
175	18 Aquarii . . .	6	21 17 34.74	3.288	13 23 46.4	15.29
176	$\xi$ AQUarii . . .	5.4	21 31 18.55	3.197	8 23 44.6	15.96
177	42 Capricorni . . .	6.5	21 34 57.98	3.264	14 35 13.7	15.87
178	$\epsilon^1$ Capricorni . . .	5.4	21 38 33.04	3.201	9 38 13.7	16.36
179	$\lambda$ Capricorni . . .	5.6	21 40 1.21	+3.232	—11 55 23.6	+ 16.42
180	$\mu$ CAPRICORNI . . .	5	21 46 41.89	3.279	14 7 12.0	16.79
181	B. A. C. 7620 . . .	6	21 47 8.19	3.212	10 52 47.0	16.78
182	30 Aquarii . . .	5.6	21 56 54.41	3.161	7 6 23.2	17.22
183	$\epsilon^1$ Aquarii . . .	5.6	22 4 4.51	3.206	11 24 54.2	17.59
184	$\theta$ AQUarii . . .	4.5	22 10 26.87	+3.170	— 8 23 5.9	+ 17.80
185	44 Aquarii . . .	6	22 10 47.47	3.137	5 59 26.1	17.87
186	$\rho$ Aquarii . . .	5.6	22 13 49.78	3.159	8 25 39.6	17.94
187	51 Aquarii . . .	6	22 17 48.63	3.128	5 26 55.4	18.08
188	$\kappa$ Aquarii . . .	5.6	22 31 29.38	3.108	4 51 6.1	18.46
189	67 Aquarii . . .	6	22 36 55.03	+3.136	— 7 35 42.8	+ 18.80
190	$\lambda$ AQUarii . . .	4	22 46 18.00	3.131	8 13 21.8	19.08
191	B. A. C. 7986 . . .	6	22 48 54.43	3.113	5 37 55.5	19.10
192	3 Piscium . . .	6	22 54 25.59	3.076	— 0 27 1.0	19.24
193	A Piscium . . .	6	23 2 28.97	+3.071	+ 1 28 9.6	+ 19.53
194	B. A. C. 8094 . . .	5.6	23 9 20.22	3.093	— 4 9 10.2	19.56
195	$\gamma$ Piscium . . .	4	23 10 53.47	3.106	+ 2 37 16.2	19.58
196	B. A. C. 8152 . . .	6.7	23 17 18.93	3.065	— 0 22 27.9	19.62
197	$\kappa$ Piscium . . .	5.6	23 20 43.72	+3.075	+ 0 35 35.3	+ 19.64
198	14 Piscium . . .	6	23 27 55.69	3.086	— 1 54 55.9	19.87
199	$\iota$ PISCiUM . . .	4.5	23 33 43.67	3.085	+ 4 58 14.8	19.49
200	$\lambda$ Piscium . . .	5	23 35 52.20	3.058	1 6 52.8	19.78
201	22 Piscium . . .	6.7	23 45 46.08	+3.068	+ 2 15 27.7	+ 19.98
202	25 Piscium . . .	6	23 46 52.85	3.071	1 25 4.0	20.04
203	$\omega$ PISCiUM . . .	4	23 53 6.91	+3.078	+ 6 11 37.1	+ 19.94

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

Day of Month.	JANUARY.			FEBRUARY.			MARCH.		
	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.
1.0	14 48.4	54 13.6	+ 0.15	15 5.2	55 15.2	+ 1.47	15 4.2	55 11.4	+ 1.50
1.5	14 49.3	54 16.9	0.33	15 10.3	55 33.8	1.62	15 9.5	55 30.7	1.69
2.0	14 50.9	54 22.8	0.59	15 15.8	55 54.1	1.76	15 15.3	55 52.3	1.87
2.5	14 53.1	54 31.1	0.77	15 21.7	56 15.9	1.86	15 21.7	56 15.8	2.04
3.0	14 56.0	54 41.5	0.95	15 28.0	56 38.9	1.94	15 28.6	56 41.1	2.16
3.5	14 59.3	54 54.0	1.11	15 34.4	57 2.6	1.99	15 35.9	57 7.8	2.25
4.0	15 3.3	55 8.4	1.26	15 40.9	57 26.5	1.98	15 43.4	57 35.4	2.31
4.5	15 7.6	55 24.3	1.37	15 47.4	57 50.2	1.94	15 50.9	58 3.2	2.32
5.0	15 12.3	55 41.3	1.46	15 53.7	58 13.1	1.86	15 58.5	58 30.8	2.27
5.5	15 17.1	55 59.2	1.52	15 59.4	58 34.6	1.73	16 5.7	58 57.5	2.18
6.0	15 22.2	56 17.8	1.57	16 4.9	58 54.4	1.56	16 12.6	59 22.8	2.02
6.5	15 27.3	56 36.7	1.57	16 9.7	59 12.1	1.38	16 18.9	59 45.9	1.82
7.0	15 32.5	56 55.6	1.55	16 13.8	59 27.2	1.15	16 24.5	60 6.3	1.56
7.5	15 37.5	57 14.0	1.50	16 17.1	59 39.5	0.90	16 29.1	60 23.4	1.27
8.0	15 42.3	57 31.6	1.43	16 19.7	59 48.9	0.65	16 32.8	60 36.7	0.95
8.5	15 46.8	57 48.2	1.34	16 21.4	59 55.2	0.39	16 35.2	60 45.9	0.59
9.0	15 51.0	58 3.7	1.23	16 22.3	59 58.4	+ 0.14	16 36.6	60 50.7	+ 0.23
9.5	15 54.8	58 17.8	1.11	16 22.3	59 58.6	- 0.10	16 36.7	60 51.3	- 0.12
10.0	15 58.3	58 30.3	0.98	16 21.7	59 56.0	0.32	16 35.8	60 47.7	0.46
10.5	16 1.2	58 41.2	0.84	16 20.2	59 50.9	0.51	16 33.7	60 40.1	0.78
11.0	16 3.7	58 50.4	0.70	16 18.3	59 43.6	0.69	16 30.6	60 29.0	1.06
11.5	16 5.8	58 58.0	0.57	16 15.8	59 34.4	0.84	16 26.8	60 14.8	1.30
12.0	16 7.4	59 4.1	0.44	16 12.9	59 23.7	0.96	16 22.2	59 58.0	1.49
12.5	16 8.8	59 8.6	0.32	16 9.5	59 11.6	1.04	16 17.0	59 39.0	1.65
13.0	16 9.5	59 11.7	0.20	16 6.0	58 58.6	1.11	16 11.4	59 18.5	1.75
13.5	16 10.1	59 13.5	+ 0.10	16 2.3	58 44.8	1.17	16 5.6	58 57.1	1.82
14.0	16 10.2	59 14.0	0.00	15 58.4	58 30.5	1.20	15 59.6	58 35.1	1.83
14.5	16 10.0	59 13.4	- 0.10	15 54.4	58 16.0	1.22	15 53.6	58 13.0	1.83
15.0	16 9.5	59 11.7	0.18	15 50.5	58 1.3	1.23	15 47.7	57 51.1	1.80
15.5	16 8.9	59 8.9	0.27	15 46.4	57 46.4	1.24	15 41.8	57 29.8	1.75
16.0	16 7.7	59 5.1	0.36	15 42.3	57 31.5	1.24	15 36.2	57 9.2	1.68
16.5	16 6.4	59 0.2	0.45	15 38.2	57 16.6	1.24	15 30.8	56 49.4	1.61
17.0	16 4.8	58 54.2	0.54	15 34.2	57 1.8	1.23	15 25.8	56 30.7	1.53
17.5	16 2.8	58 47.0	0.65	15 30.2	56 47.0	1.23	15 21.0	56 13.0	1.43
18.0	16 0.5	58 38.6	0.75	15 26.2	56 32.2	1.22	15 16.4	55 56.3	1.34
18.5	15 57.9	58 29.0	0.85	15 22.2	56 17.6	1.21	15 12.2	55 40.8	1.26
19.0	15 54.9	58 18.1	0.96	15 18.3	56 3.2	1.19	15 8.3	55 26.3	1.17
19.5	15 51.6	58 5.9	1.06	15 14.4	55 49.0	1.17	15 4.5	55 12.8	1.08
20.0	15 48.1	57 52.7	1.16	15 10.6	55 35.1	1.14	15 1.2	55 0.4	0.99
20.5	15 44.1	57 38.1	1.25	15 7.0	55 21.7	1.09	14 58.1	54 49.1	0.90
21.0	15 39.9	57 22.6	1.32	15 3.5	55 8.2	1.04	14 55.3	54 38.8	0.82
21.5	15 35.5	57 6.3	1.39	15 0.1	54 56.6	0.98	14 52.8	54 29.6	0.73
22.0	15 30.8	56 49.2	1.45	14 57.1	54 45.3	0.90	14 50.6	54 21.4	0.63
22.5	15 26.1	56 31.7	1.47	14 54.3	54 35.0	0.81	14 48.7	54 14.4	0.54
23.0	15 21.3	56 14.1	1.47	14 51.7	54 25.9	0.70	14 47.0	54 8.4	0.44
23.5	15 16.5	55 56.6	1.43	14 49.8	54 18.3	0.58	14 45.8	54 3.7	0.33
24.0	15 11.8	55 39.6	1.38	14 48.1	54 12.3	0.44	14 44.8	54 0.4	0.22
24.5	15 7.4	55 23.4	1.32	14 46.9	54 8.0	0.28	14 44.3	53 58.6	- 0.09
25.0	15 3.3	55 8.1	1.22	14 46.2	54 5.6	- 0.10	14 44.2	53 58.3	+ 0.04
25.5	14 59.4	54 54.2	1.10	14 46.2	54 5.4	+ 0.08	14 44.6	53 59.6	0.19
26.0	14 56.2	54 42.0	0.94	14 46.7	54 7.5	0.26	14 45.5	54 2.8	0.35
26.5	14 53.3	54 31.5	0.78	14 47.9	54 11.9	0.46	14 46.9	54 8.0	0.51
27.0	14 51.0	54 23.1	0.60	14 49.8	54 18.7	0.67	14 48.9	54 15.2	0.68
27.5	14 49.3	54 16.9	0.42	14 52.4	54 28.1	0.88	14 51.4	54 24.4	0.86
28.0	14 48.3	54 13.1	0.22	14 55.6	54 40.0	1.10	14 54.5	54 36.0	1.05
28.5	14 47.9	54 11.6	- 0.01	14 59.5	54 54.5	1.30	14 58.3	54 49.8	1.24
29.0	14 48.2	54 12.9	+ 0.21	15 4.2	55 11.4	1.50	15 2.6	55 5.9	1.43
29.5	14 49.3	54 16.8	0.44	15 9.4	55 30.7	1.69	15 7.7	55 24.4	1.61
30.0	14 51.1	54 23.4	0.65	15 15.3	55 52.3	1.87	15 13.2	55 44.6	1.80
30.5	14 53.7	54 32.7	0.87	15 21.7	56 15.8	+ 2.04	15 19.4	56 7.4	1.98
31.0	14 56.8	54 44.4	1.07				15 26.2	56 32.1	2.13
31.5	15 0.7	54 58.6	+ 1.28				15 33.3	56 58.5	+ 2.26

$$\Delta s = .272 \Delta \pi$$

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.			MAY.			JUNE.		
	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.
d									
1.0	15 40.9	57 26.4	+ 2.36	16 7.3	59 3.5	+ 2.27	16 33.1	60 38.0	+ 0.99
1.5	15 48.8	57 55.2	2.42	16 14.6	59 30.3	2.19	16 35.9	60 48.1	0.69
2.0	15 56.7	58 24.5	2.45	16 21.6	59 55.8	2.04	16 37.5	60 54.3	+ 0.35
2.5	16 4.7	58 53.8	2.41	16 28.0	60 19.2	1.85	16 38.1	60 56.3	0.00
3.0	16 13.5	59 22.3	2.32	16 33.6	60 40.0	1.60	16 37.5	60 54.0	- 0.37
3.5	16 19.8	59 49.3	2.16	16 38.4	60 57.5	1.29	16 35.7	60 47.4	0.73
4.0	16 26.6	60 14.1	1.95	16 42.1	61 11.0	0.94	16 32.7	60 36.5	1.07
4.5	16 32.5	60 36.0	1.68	16 44.5	61 19.9	0.54	16 28.6	60 21.6	1.39
5.0	16 37.6	60 54.4	1.36	16 45.6	61 23.9	+ 0.13	16 23.6	60 3.2	1.67
5.5	16 41.4	61 8.6	0.99	16 45.3	61 22.9	- 0.29	16 17.7	59 41.6	1.91
6.0	16 44.0	61 18.1	0.59	16 43.7	61 16.9	0.70	16 11.1	59 17.4	2.09
6.5	16 45.2	61 22.6	+ 0.17	16 40.7	61 6.0	1.09	16 4.1	58 51.4	2.21
7.0	16 45.1	61 22.2	- 0.24	16 36.6	60 50.8	1.44	15 56.6	58 24.2	2.29
7.5	16 43.7	61 16.9	0.64	16 31.3	60 31.5	1.74	15 49.1	57 56.5	2.32
8.0	16 40.9	61 6.8	1.02	16 25.1	60 8.8	2.00	15 41.6	57 28.7	2.29
8.5	16 37.0	60 52.4	1.36	16 18.2	59 43.5	2.19	15 34.1	57 1.6	2.23
9.0	16 32.0	60 34.2	1.65	16 10.8	59 16.2	2.33	15 27.0	56 35.4	2.13
9.5	16 26.2	60 12.8	1.88	16 3.1	58 47.7	2.40	15 20.3	56 10.7	1.99
10.0	16 19.7	59 48.9	2.06	15 55.1	58 18.6	2.42	15 14.1	55 47.7	1.83
10.5	16 12.8	59 23.3	2.18	15 47.2	57 49.6	2.39	15 8.4	55 26.7	1.65
11.0	16 5.5	58 56.7	2.25	15 39.5	57 21.2	2.33	15 3.3	55 8.0	1.47
11.5	15 58.1	58 29.4	2.27	15 32.0	56 53.8	2.22	14 58.8	54 51.6	1.27
12.0	15 50.7	58 2.2	2.24	15 25.0	56 27.9	2.08	14 54.9	54 37.6	1.07
12.5	15 43.4	57 35.6	2.18	15 18.4	56 3.8	1.93	14 51.8	54 26.1	0.86
13.0	15 36.4	57 9.9	2.09	15 12.3	55 41.5	1.76	14 49.4	54 17.0	0.66
13.5	15 29.8	56 45.4	1.98	15 6.9	55 21.3	1.58	14 47.6	54 10.4	0.46
14.0	15 23.5	56 22.3	1.86	15 2.0	55 3.4	1.40	14 46.4	54 6.2	0.26
14.5	15 17.6	56 0.8	1.73	14 57.7	54 47.7	1.23	14 45.9	54 4.2	- 0.08
15.0	15 12.2	55 41.0	1.57	14 54.0	54 34.2	1.04	14 45.9	54 4.4	+ 0.10
15.5	15 7.3	55 23.0	1.42	14 50.9	54 22.9	0.85	14 46.5	54 6.6	0.26
16.0	15 2.9	55 6.9	1.27	14 48.5	54 13.8	0.67	14 47.7	54 10.7	0.42
16.5	14 59.1	54 52.6	1.13	14 46.6	54 6.8	0.50	14 49.2	54 16.6	0.56
17.0	14 55.6	54 39.9	0.98	14 45.2	54 1.8	0.34	14 51.3	54 24.0	0.67
17.5	14 52.6	54 29.0	0.84	14 44.3	53 58.6	0.19	14 53.7	54 32.8	0.77
18.0	14 50.1	54 19.7	0.70	14 43.9	53 57.1	- 0.04	14 56.4	54 42.7	0.86
18.5	14 48.0	54 12.0	0.58	14 44.0	53 57.4	+ 0.09	14 59.3	54 53.6	0.94
19.0	14 46.3	54 5.9	0.45	14 44.5	53 59.2	0.21	15 2.5	55 5.4	1.01
19.5	14 45.0	54 1.2	0.34	14 45.4	54 2.4	0.34	15 6.0	55 18.0	1.07
20.0	14 44.1	53 57.9	0.23	14 46.6	54 7.0	0.43	15 9.6	55 31.3	1.13
20.5	14 43.6	53 55.9	0.12	14 48.2	54 12.9	0.53	15 13.4	55 45.2	1.18
21.0	14 43.4	53 55.2	- 0.01	14 50.1	54 19.9	0.63	15 17.3	55 59.6	1.22
21.5	14 43.6	53 55.9	+ 0.11	14 52.4	54 28.0	0.72	15 21.3	56 14.5	1.25
22.0	14 44.1	53 57.7	0.21	14 54.9	54 37.3	0.82	15 25.5	56 29.7	1.27
22.5	14 45.0	54 1.0	0.34	14 57.7	54 47.8	0.92	15 29.7	56 45.2	1.30
23.0	14 46.3	54 5.8	0.46	15 0.9	54 59.5	1.01	15 33.0	57 1.0	1.33
23.5	14 48.0	54 12.2	0.59	15 4.4	55 12.3	1.11	15 38.4	57 17.1	1.35
24.0	14 50.2	54 20.1	0.72	15 8.2	55 26.2	1.21	15 42.8	57 33.4	1.36
24.5	14 52.8	54 29.6	0.86	15 12.3	55 41.4	1.31	15 47.3	57 49.7	1.37
25.0	14 55.8	54 40.8	1.01	15 16.8	55 57.8	1.41	15 51.7	58 6.1	1.37
25.5	14 59.3	54 53.8	1.16	15 21.5	56 15.3	1.51	15 56.2	58 22.4	1.35
26.0	15 3.4	55 8.6	1.31	15 26.7	56 34.0	1.60	16 0.6	58 38.6	1.32
26.5	15 7.9	55 25.2	1.46	15 32.0	56 53.7	1.68	16 4.9	58 54.3	1.28
27.0	15 12.9	55 43.6	1.61	15 37.7	57 14.4	1.76	16 9.0	59 9.3	1.22
27.5	15 18.4	56 3.9	1.76	15 43.6	57 36.1	1.83	16 12.8	59 23.4	1.13
28.0	15 24.4	56 25.9	1.91	15 49.6	57 58.5	1.88	16 16.3	59 36.2	1.01
28.5	15 30.9	56 49.6	2.04	15 55.8	58 21.2	1.91	16 19.3	59 47.5	0.86
29.0	15 37.8	57 14.8	2.14	16 2.1	58 44.1	1.90	16 21.9	59 56.8	0.69
29.5	15 44.9	57 41.1	2.22	16 8.3	59 6.7	1.85	16 23.8	60 3.8	0.49
30.0	15 52.3	57 8.2	2.28	16 14.1	59 28.5	1.78	16 25.0	60 8.3	+ 0.25
30.5	15 59.8	58 35.9	+ 2.31	16 19.8	59 49.1	1.64	16 25.4	60 9.8	0.00
31.0				16 24.9	60 7.9	1.47	16 25.0	60 8.2	- 0.26
31.5				16 29.4	60 24.4	+ 1.26	16 23.7	60 3.4	- 0.54
	$\Delta s = .272 \Delta \pi$								

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.			AUGUST.			SEPTEMBER.		
	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.
1.0	16 25.0	60 8.2	— 0.26	15 52.5	58 8.9	— 1.38	15 12.9	55 43.6	— 1.28
1.5	16 23.7	60 3.4	0.54	15 47.8	57 51.6	1.48	15 8.8	55 28.4	1.23
2.0	16 21.5	59 55.3	0.81	15 42.8	57 33.2	1.57	15 4.9	55 14.0	1.17
2.5	16 18.4	59 44.0	1.06	15 37.6	57 14.0	1.63	15 1.2	55 0.5	1.08
3.0	16 14.5	59 29.7	1.30	15 32.1	56 54.2	1.66	14 57.8	54 48.0	0.98
3.5	16 9.9	59 12.7	1.52	15 26.7	56 34.2	1.67	14 54.8	54 37.0	0.85
4.0	16 4.5	58 53.3	1.70	15 21.3	56 14.3	1.63	14 52.2	54 27.6	0.71
4.5	15 58.7	58 31.9	1.85	15 16.1	55 55.1	1.58	14 50.2	54 20.1	0.54
5.0	15 52.5	58 9.0	1.95	15 11.1	55 36.8	1.48	14 48.7	54 14.6	0.36
5.5	15 46.0	57 45.1	2.01	15 6.4	55 19.7	1.37	14 47.8	54 11.3	— 0.18
6.0	15 39.4	57 20.8	2.02	15 2.2	55 4.1	1.23	14 47.6	54 10.4	+ 0.01
6.5	15 32.8	56 56.5	2.00	14 58.4	54 50.2	1.06	14 47.9	54 11.8	0.22
7.0	15 26.3	56 32.6	1.95	14 55.2	54 38.4	0.89	14 49.0	54 15.8	0.43
7.5	15 20.1	56 9.7	1.86	14 52.6	54 28.9	0.71	14 50.8	54 22.4	0.65
8.0	15 14.2	55 48.3	1.73	14 50.7	54 21.7	0.51	14 53.3	54 31.6	0.86
8.5	15 8.8	55 28.4	1.58	14 49.4	54 17.0	0.29	14 56.5	54 43.2	1.07
9.0	15 3.9	55 10.4	1.40	14 48.8	54 14.8	— 0.08	15 0.4	54 57.4	1.27
9.5	14 59.5	54 54.6	1.22	14 48.9	54 15.2	+ 0.14	15 4.8	55 13.9	1.46
10.0	14 55.9	54 41.2	1.02	14 49.7	54 18.2	0.35	15 10.0	55 32.7	1.64
10.5	14 52.9	54 30.2	0.82	14 51.2	54 23.8	0.56	15 15.6	55 53.4	1.80
11.0	14 50.7	54 21.7	0.60	14 53.4	54 31.9	0.77	15 21.7	56 15.8	1.92
11.5	14 49.0	54 15.8	0.38	14 56.3	54 42.3	0.96	15 28.1	56 39.5	2.02
12.0	14 48.1	54 12.6	— 0.17	14 59.7	54 55.0	0.14	15 34.9	57 4.2	2.08
12.5	14 47.9	54 11.9	+ 0.04	15 3.7	55 9.8	1.31	15 41.7	57 29.5	2.11
13.0	14 48.4	54 13.6	0.24	15 8.3	55 26.3	1.45	15 48.7	57 54.8	2.09
13.5	14 49.6	54 17.7	0.42	15 13.2	55 44.4	1.56	15 55.4	58 19.6	2.03
14.0	14 51.3	54 24.0	0.60	15 18.4	56 3.8	1.65	16 1.9	58 43.3	1.92
14.5	14 53.5	54 32.3	0.78	15 23.9	56 24.0	1.72	16 7.9	59 5.5	1.77
15.0	14 56.3	54 42.5	0.92	15 29.6	56 44.8	1.73	16 13.4	59 25.6	1.57
15.5	14 59.5	54 54.3	1.05	15 35.2	57 5.6	1.73	16 18.1	59 43.0	1.33
16.0	15 3.1	55 7.6	1.16	15 40.9	57 26.2	1.69	16 22.0	59 57.3	1.06
16.5	15 7.1	55 22.1	1.24	15 46.3	57 46.2	1.63	16 25.0	60 8.4	0.78
17.0	15 11.2	55 37.5	1.31	15 51.5	58 5.3	1.53	16 27.1	60 16.0	0.48
17.5	15 15.6	55 53.6	1.36	15 56.3	58 22.9	1.40	16 28.2	60 20.0	+ 0.19
18.0	15 20.2	56 10.1	1.38	16 0.4	58 38.8	1.25	16 28.3	60 20.5	— 0.10
18.5	15 24.7	56 26.7	1.39	16 4.4	58 52.9	1.08	16 27.6	60 17.7	0.37
19.0	15 29.2	56 43.4	1.37	16 7.7	59 4.9	0.91	16 25.9	60 11.6	0.62
19.5	15 33.7	56 59.8	1.34	16 10.4	59 14.6	0.73	16 23.5	60 2.8	0.84
20.0	15 38.0	57 15.7	1.29	16 12.4	59 22.2	0.54	16 20.4	59 51.6	1.02
20.5	15 42.1	57 30.9	1.24	16 13.9	59 27.6	0.36	16 16.8	59 38.2	1.18
21.0	15 46.1	57 45.4	1.19	16 14.8	59 30.7	0.18	16 12.7	59 23.2	1.30
21.5	15 49.2	57 59.2	1.12	16 15.1	59 31.7	+ 0.02	16 8.4	59 7.1	1.38
22.0	15 53.4	58 12.1	1.04	16 14.8	59 30.9	— 0.14	16 3.7	58 50.1	1.44
22.5	15 56.6	58 24.1	0.96	16 14.1	59 28.4	0.28	15 58.9	58 32.4	1.47
23.0	15 59.6	58 35.1	0.88	16 13.1	59 24.3	0.40	15 54.1	58 14.7	1.47
23.5	16 2.3	58 45.0	0.79	16 11.2	59 18.8	0.51	15 49.3	57 57.1	1.47
24.0	16 4.8	58 54.0	0.71	16 9.7	59 12.1	0.60	15 44.5	57 39.6	1.45
24.5	16 6.6	59 0.9	0.62	16 7.5	59 4.3	0.69	15 39.8	57 22.3	1.42
25.0	16 8.9	59 8.8	0.53	16 5.2	58 55.5	0.76	15 35.2	57 5.6	1.38
25.5	16 10.4	59 14.6	0.43	16 2.5	58 45.9	0.83	15 30.8	56 49.2	1.35
26.0	16 11.6	59 19.2	0.33	15 59.7	58 35.4	0.90	15 26.4	56 33.2	1.31
26.5	16 12.5	59 22.6	0.23	15 56.6	58 24.2	0.96	15 22.2	56 17.8	1.26
27.0	16 13.1	59 24.6	+ 0.11	15 53.4	58 12.3	1.02	15 18.2	56 2.0	1.22
27.5	16 13.3	59 25.1	— 0.02	15 49.9	57 59.6	1.08	15 14.2	55 48.5	1.17
28.0	16 13.0	59 24.0	0.16	15 46.3	57 46.2	1.14	15 10.5	55 34.6	1.12
28.5	16 12.1	59 21.3	0.31	15 42.5	57 32.1	1.20	15 6.9	55 21.4	1.07
29.0	16 11.0	59 16.7	0.46	15 38.5	57 17.4	1.25	15 3.6	55 9.1	1.01
29.5	16 9.2	59 10.2	0.62	15 34.3	57 2.2	1.28	15 0.4	54 57.4	0.95
30.0	16 6.9	59 1.7	0.79	15 30.1	56 46.7	1.31	14 57.4	54 46.4	0.88
30.5	16 4.0	58 51.2	0.96	15 25.8	56 30.9	1.32	14 54.6	54 36.4	— 0.79
31.0	16 0.6	58 38.8	1.11	15 21.5	56 15.0	1.32			
31.5	15 56.7	58 24.6	— 1.25	15 17.2	55 59.1	— 1.31			

 $\Delta s = 272 \Delta \tau$

FOR WASHINGTON MEAN NOON AND MIDNIGHT.									
Day of Month.	OCTOBER.			NOVEMBER.			DECEMBER.		
	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.
1.0	14 52.2	54 27.3	-0.70	14 44.7	53 59.8	+0.22	14 54.2	54 34.9	+0.82
1.5	14 50.0	54 19.5	0.60	14 45.6	54 3.3	0.36	14 57.1	54 45.5	0.95
2.0	14 48.3	54 13.0	0.48	14 47.0	54 8.6	0.51	15 0.4	54 57.6	1.07
2.5	14 46.8	54 7.9	0.35	14 49.0	54 15.6	0.66	15 4.1	55 11.2	1.20
3.0	14 45.9	54 4.5	0.21	14 51.4	54 24.5	0.83	15 8.2	55 26.3	1.33
3.5	14 45.5	54 2.8	-0.06	14 54.4	54 35.4	1.01	15 12.8	55 43.0	1.46
4.0	14 45.6	54 3.0	+0.11	14 57.9	54 48.5	1.18	15 17.8	56 1.3	1.59
4.5	14 46.2	54 5.4	0.29	15 2.1	55 3.7	1.36	15 23.2	56 21.2	1.72
5.0	14 47.5	54 10.0	0.47	15 6.8	55 21.1	1.54	15 29.0	56 42.7	1.84
5.5	14 49.3	54 16.9	0.66	15 12.1	55 40.6	1.71	15 35.2	57 5.5	1.95
6.0	14 51.8	54 26.1	0.86	15 18.0	56 2.2	1.88	15 41.7	57 29.4	2.04
6.5	14 55.0	54 37.8	1.07	15 24.4	56 25.7	2.04	15 48.6	57 54.3	2.11
7.0	14 58.9	54 52.0	1.28	15 31.3	56 51.0	2.18	15 55.5	58 20.0	2.16
7.5	15 3.4	55 8.6	1.47	15 38.6	57 17.9	2.29	16 2.6	58 46.0	2.16
8.0	15 8.5	55 27.4	1.66	15 46.3	57 46.0	2.37	16 9.6	59 11.8	2.12
8.5	15 14.3	55 48.6	1.84	15 54.1	58 14.8	2.42	16 16.4	59 36.7	2.02
9.0	15 20.7	56 12.0	2.02	16 2.0	58 43.8	2.41	16 22.8	60 0.1	1.87
9.5	15 27.5	56 37.1	2.16	16 9.8	59 12.5	2.36	16 28.6	60 21.5	1.68
10.0	15 34.8	57 3.8	2.27	16 17.3	59 40.1	2.24	16 33.7	60 40.1	1.42
10.5	15 42.3	57 31.6	2.34	16 24.4	60 6.1	2.06	16 37.8	60 55.3	1.11
11.0	15 50.1	58 0.0	2.38	16 30.9	60 29.7	1.84	16 40.8	61 6.5	0.75
11.5	15 57.8	58 28.6	2.36	16 36.4	60 50.0	1.54	16 42.7	61 13.4	+0.37
12.0	16 5.5	58 56.6	2.29	16 40.8	61 6.4	1.19	16 43.3	61 15.5	-0.03
12.5	16 12.8	59 23.4	2.17	16 44.1	61 18.4	0.80	16 42.5	61 12.6	0.44
13.0	16 19.6	59 48.4	1.99	16 46.0	61 25.5	+0.38	16 40.4	61 4.9	0.84
13.5	16 25.7	60 10.9	1.75	16 46.5	61 27.5	-0.04	16 37.0	60 52.5	1.21
14.0	16 31.0	60 30.3	1.46	16 45.7	61 24.4	0.47	16 32.5	60 35.8	1.55
14.5	16 35.2	60 45.9	1.13	16 43.5	61 16.2	0.89	16 26.0	60 15.2	1.85
15.0	16 38.3	60 57.2	0.76	16 39.9	61 3.2	1.26	16 20.4	59 51.5	2.08
15.5	16 40.2	61 4.1	+0.38	16 35.2	60 45.9	1.59	16 13.3	59 25.4	2.26
16.0	16 40.8	61 6.3	-0.01	16 29.6	60 25.1	1.87	16 5.7	58 57.5	2.37
16.5	16 40.1	61 3.8	0.39	16 23.0	60 1.2	2.09	15 57.9	58 28.5	2.44
17.0	16 38.2	60 56.9	0.74	16 16.0	59 35.0	2.26	15 49.6	57 59.2	2.43
17.5	16 35.2	60 45.9	1.06	16 8.4	59 7.1	2.36	15 42.0	57 30.2	2.38
18.0	16 31.2	60 31.2	1.36	16 0.5	58 38.5	2.40	15 34.4	57 2.0	2.30
18.5	16 26.4	60 13.3	1.60	15 52.7	58 9.8	2.37	15 27.0	56 35.1	2.18
19.0	16 20.8	59 52.9	1.78	15 45.0	57 41.6	2.33	15 20.1	56 9.9	2.02
19.5	16 14.7	59 30.6	1.91	15 37.6	57 14.2	2.23	15 13.8	55 46.7	1.84
20.0	16 8.4	59 7.0	1.99	15 30.5	56 48.1	2.11	15 8.1	55 25.7	1.66
20.5	16 1.6	58 42.5	2.04	15 23.8	56 23.6	1.97	15 2.9	55 7.0	1.47
21.0	15 55.0	58 18.2	2.03	15 17.6	56 0.9	1.81	14 58.5	54 50.6	1.27
21.5	15 48.5	57 54.1	1.99	15 12.0	55 40.1	1.64	14 54.7	54 36.6	1.07
22.0	15 42.0	57 30.5	1.93	15 6.9	55 21.4	1.48	14 51.6	54 25.1	0.87
22.5	15 35.9	57 7.9	1.85	15 2.3	55 4.6	1.31	14 49.1	54 16.0	0.67
23.0	15 29.9	56 46.0	1.75	14 58.3	54 49.9	1.14	14 47.2	54 9.1	0.48
23.5	15 24.3	56 25.6	1.64	14 54.8	54 37.1	0.98	14 45.9	54 4.3	0.30
24.0	15 19.2	56 6.6	1.53	14 51.8	54 26.2	0.82	14 45.2	54 1.8	-0.13
24.5	15 14.3	55 48.9	1.41	14 49.4	54 17.2	0.68	14 45.1	54 1.3	+0.02
25.0	15 9.9	55 32.6	1.30	14 47.5	54 10.0	0.53	14 45.4	54 2.4	0.16
25.5	15 5.9	55 17.7	1.19	14 45.0	54 4.5	0.39	14 46.1	54 5.2	0.30
26.0	15 2.2	55 4.2	1.08	14 44.9	54 0.6	0.26	14 47.3	54 9.6	0.42
26.5	14 58.8	54 51.9	0.97	14 44.2	53 58.2	0.14	14 48.9	54 15.4	0.52
27.0	14 55.8	54 40.9	0.86	14 43.9	53 57.1	-0.03	14 50.8	54 22.4	0.62
27.5	14 53.2	54 31.3	0.76	14 44.0	53 57.4	+0.08	14 53.0	54 30.4	0.71
28.0	14 50.9	54 22.9	0.65	14 44.5	53 59.0	0.18	14 55.5	54 39.4	0.79
28.5	14 49.0	54 15.7	0.55	14 45.2	54 1.8	0.28	14 58.2	54 49.4	0.86
29.0	14 47.3	54 9.6	0.45	14 46.3	54 5.9	0.39	15 1.1	55 0.2	0.93
29.5	14 46.0	54 4.7	0.36	14 47.8	54 11.2	0.49	15 4.3	55 11.9	1.00
30.0	14 45.0	54 1.0	0.26	14 49.6	54 17.7	0.60	15 7.6	55 24.3	1.06
30.5	14 44.3	53 58.6	0.14	14 51.6	54 25.6	0.71	15 11.2	55 37.5	1.12
31.0	14 44.0	53 57.6	-0.03	$\Delta s = 272 \Delta \pi$			15 15.1	55 51.4	1.18
31.5	14 44.1	53 58.0	+0.09				15 19.1	56 6.1	+1.25

## WASHINGTON MEAN TIME.

## PHASES.

Month.	Full Moon.	Last Quarter.	New Moon.	First Quarter.	Full Moon.
	d h m	d h m	d h m	d h m	d h m
January	7 18 39.5	14 17 54.3	21 18 42.9	29 18 36.4	
February	6 8 33.5	13 1 45.7	20 10 54.9	28 14 50.0	
March	7 20 1.3	14 10 33.0	22 3 56.2	30 7 56.5	
April	6 5 16.4	12 21 1.2	20 20 47.3	29 21 8.0	
May	5 13 4.4	12 9 27.7	20 12 42.4	28 6 28.4	
June	3 20 27.6	10 23 47.8	19 3 11.3	26 12 47.8	
July	3 4 29.6	10 15 46.1	18 15 57.7	25 17 27.5	
August	1 14 4.1	9 9 0.5	17 3 2.3	23 22 3.7	31 1 49.6
September		8 2 55.8	15 12 48.5	22 4 11.5	29 16 8.7
October		7 20 35.0	14 22 0.8	21 13 10.7	29 9 1.2
November		6 12 47.2	13 7 30.5	20 1 46.7	28 3 49.3
December		6 2 35.1	12 17 56.2	19 18 7.4	27 23 7.4

## APOGEE, PERIGEE, AND GREATEST LIBRATION.

Month.	Perigee.	Apogee.	Perigee.	Greatest Libration.		
	d h	d h	d h	d h m	d h m	d h m
January	14 0.0	28 12.5		7 0 55 s.e.	21 19 15 n.w.	
February	9 6.0	25 6.7		3 12 11 s.e.	16 23 26 n.w.	
March	9 7.9	24 20.3		3 12 41 s.e.	15 23 10 n.w.	31 18 11 s.e.
April	6 17.0	21 1.0			12 21 18 n.w.	28 23 13 s.e.
May	5 3.7	18 3.7			11 3 41 n.w.	26 21 45 s.e.
June	2 12.0	14 17.3	30 12.0		8 8 22 n.w.	23 2 16 s.e.
July		12 9.7	27 10.0		6 7 59 n.w.	19 9 53 s.e.
August		9 4.4	21 13.5	2 21 18 n.w.	15 8 30 s.e.	29 15 38 n.w.
September		5 23.4	17 19.9		12 0 44 s.e.	24 23 40 n.w.
October		3 16.2	15 23.7		16 3 8 s.e.	22 9 45 n.w.
October		31 3.0				
November	13 10.9	27 3.3			7 10 7 s.e.	19 12 14 n.w.
December	11 22.6	24 10.4			5 15 55 s.e.	17 19 40 n.w.

## MOON'S EQUATOR.

The moon's libration in latitude and longitude, at any time, may be found by means of the following formulas and tables:

$I$  = the inclination to the ecliptic of the moon's equator =  $1^{\circ} 28' 8''$ ,

$\Omega$  = mean longitude of the moon's ascending node, (see page 250),

= mean longitude of the descending node of the moon's equator,

$C$  = the angle at the centre of the moon's disc made by a meridian of the moon with the circle of declination, reckoned from north to east on the apparent disc,

$i$ ,  $\Delta$ ,  $\Omega'$ , and  $\zeta$  are defined on the next page, where their values for the year are given.

$\lambda$ ,  $\beta$ ,  $\alpha'$ , and  $\delta'$  the apparent longitude, latitude, right ascension, and declination of the moon affected with parallax.

$\lambda'$  = the selenocentric longitude of the earth, reckoned on the moon's equator from its descending node,  $\Omega$ .

$$\left. \begin{aligned} \Delta \lambda &= -0.57 \sin 2 (\Omega - \lambda) \\ \alpha &= \sin I \cos (\Omega - \lambda) \\ \tan B &= \tan I \sin (\Omega - \lambda) \\ \lambda' &= \lambda + \Delta \lambda + \alpha b \end{aligned} \right\} \text{See table, page 343.}$$

The libration in latitude =  $b = B - \beta$ ,

" " longitude =  $l = \lambda' - \zeta$ .

$$\sin C = \sin i \frac{\cos (\lambda' + \Delta - \Omega)}{\cos \delta'} = -\sin i \frac{\cos (\alpha' - \Omega')}{\cos b}.$$



WASHINGTON MEAN TIME.							
Mean Noon.	MOON'S EQUATOR.			Moon's Mean Longitude.	Mean Solar Days.	Motion of $\zeta$ .	
	$i$ Inclination to the Earth's Equator.	$\Delta$ Ascend'g Node on Earth's Equator to Ascending Node on Ecliptic.	$\Omega'$ Ascend'g Node on Earth's Equator.				
Jan. 0	22° 37.9	122° 26.6	3° 8.3	10° 17.7	0.1	1° 19.06	
10	22 38.6	121 53.8	3 9.5	142 3.6	0.2	2 38.12	
20	22 39.3	121 21.0	3 10.6	273 49.4	0.3	3 57.18	
30	22 40.0	120 48.2	3 11.7	45 35.2	0.4	5 16.23	
Feb. 9	22 40.7	120 15.4	3 12.8	177 21.1	0.5	6 35.29	
					0.6	7 54.35	
19	22 41.4	119 42.7	3 13.8	309 6.9	0.7	9 13.41	
March 1	22 42.1	119 10.0	3 14.9	80 52.8	0.8	10 32.47	
11	22 42.8	118 37.2	3 15.9	212 38.6	0.9	11 51.53	
21	22 43.5	118 4.5	3 16.9	344 24.4	1.0	13 10.58	
31	22 44.2	117 31.9	3 17.9	116 10.3			
					2.0	26 21.17	
April 10	22 45.0	116 59.2	3 18.9	247 56.1	3.0	39 31.75	
20	22 45.7	116 26.6	3 19.8	19 42.0	4.0	52 42.33	
30	22 46.4	115 54.0	3 20.8	151 27.8	5.0	65 52.92	
May 10	22 47.2	115 21.4	3 21.7	283 13.6	6.0	79 3.50	
20	22 47.9	114 48.8	3 22.6	54 59.5	7.0	92 14.09	
					8.0	105 24.67	
30	22 48.7	114 16.2	3 23.5	186 45.3	9.0	118 35.25	
June 9	22 49.4	113 43.6	3 24.3	318 31.2	10.0	131 45.84	
19	22 50.2	113 11.1	3 25.2	90 17.0	Hours.		
29	22 50.9	112 38.5	3 26.0	222 2.8	1	0° 32.94	
July 9	22 51.7	112 6.0	3 26.8	353 48.7	2	1 5.88	
					3	1 38.82	
19	22 52.4	111 33.5	3 27.6	125 34.5	4	2 11.76	
29	22 53.2	111 1.1	3 28.3	257 20.4	5	2 44.70	
Aug. 8	22 54.0	110 28.6	3 29.1	29 6.2	6	3 17.65	
18	22 54.7	109 56.2	3 29.8	160 52.0	7	3 50.59	
28	22 55.5	109 23.8	3 30.5	292 37.8	8	4 23.53	
					9	4 56.47	
Sept. 7	22 56.3	108 51.4	3 31.2	64 23.7	10	5 29.41	
17	22 57.0	108 19.1	3 31.9	196 9.5			
27	22 57.8	107 46.7	3 32.5	327 55.3	11	6 2.35	
Oct. 7	22 58.6	107 14.3	3 33.2	99 41.1	12	6 35.29	
17	22 59.4	106 42.0	3 33.8	231 27.0	13	7 8.23	
					14	7 41.17	
					15	8 14.11	
27	23 0.2	106 9.6	3 34.4	3 12.9			
Nov. 6	23 1.0	105 37.3	3 35.0	134 58.7	16	8 47.06	
16	23 1.7	105 5.1	3 35.5	266 44.5	17	9 20.00	
26	23 2.5	104 32.8	3 36.1	38 30.4	18	9 52.94	
					19	10 25.88	
Dec. 6	23 3.3	104 0.6	3 36.6	170 16.2	20	10 58.82	
16	23 4.1	103 28.4	3 37.1	302 2.0	21	11 31.76	
26	23 4.9	102 56.2	3 37.6	73 47.9	22	12 4.70	
36	23 5.7	102 24.0	3 38.0	205 33.7	23	12 37.64	

TABLE FOR THE LIBRATION OF THE MOON.

Argument,  $(\Omega - \lambda)$  or  $(\Omega - \lambda - 180^\circ)$ .

$\Omega - \lambda$	$\Delta \lambda$	$\frac{1}{a}$	$B$	$\Omega - \lambda$	$\Omega - \lambda$	$\Delta \lambda$	$\frac{1}{a}$	$B$	$\Omega - \lambda$
0	0.0	39	0 0.0	180	46	0.6	56	1 3.9	134
1	0.0	39	0 1.6	179	47	0.6	57	1 4.9	133
2	0.0	39	0 3.1	178	48	0.6	58	1 6.0	132
3	0.1	39	0 4.7	177	49	0.6	59	1 7.0	131
4	0.1	39	0 6.2	176	50	0.6	60	1 8.0	130
5	0.1	39	0 7.7	175	51	0.6	62	1 9.0	129
6	0.2	39	0 9.3	174	52	0.6	63	1 10.0	128
7	0.2	39	0 10.8	173	53	0.5	64	1 10.9	127
8	0.2	39	0 12.4	172	54	0.5	66	1 11.8	126
9	0.2	39	0 13.9	171	55	0.5	67	1 12.7	125
10	0.2	39	0 15.4	170	56	0.5	69	1 13.6	124
11	0.3	39	0 16.9	169	57	0.5	71	1 14.5	123
12	0.3	40	0 18.5	168	58	0.5	73	1 15.3	122
13	0.3	40	0 20.0	167	59	0.5	75	1 16.1	121
14	0.3	40	0 21.5	166	60	0.5	77	1 16.9	120
15	0.3	40	0 23.0	165	61	0.5	80	1 17.6	119
16	0.3	40	0 24.5	164	62	0.5	83	1 18.4	118
17	0.3	40	0 26.0	163	63	0.5	86	1 19.1	117
18	0.3	41	0 27.4	162	64	0.5	89	1 19.8	116
19	0.4	41	0 28.9	161	65	0.4	92	1 20.4	115
20	0.4	41	0 30.4	160	66	0.4	95	1 21.1	114
21	0.4	41	0 31.8	159	67	0.4	99	1 21.7	113
22	0.4	42	0 33.2	158	68	0.4	103	1 22.3	112
23	0.4	42	0 34.7	157	69	0.4	108	1 22.9	111
24	0.4	42	0 36.1	156	70	0.4	113	1 23.4	110
25	0.4	43	0 37.5	155	71	0.4	119	1 23.9	109
26	0.5	43	0 38.9	154	72	0.4	125	1 24.4	108
27	0.5	43	0 40.3	153	73	0.4	132	1 24.9	107
28	0.5	44	0 41.7	152	74	0.3	141	1 25.3	106
29	0.5	44	0 43.1	151	75	0.3	150	1 25.7	105
30	0.5	45	0 44.4	150	76	0.3	160	1 26.1	104
31	0.5	45	0 45.7	149	77	0.3	172	1 26.5	103
32	0.5	46	0 47.0	148	78	0.2	186	1 26.8	102
33	0.5	46	0 48.4	147	79	0.2	202	1 27.1	101
34	0.5	47	0 49.7	146	80	0.2	222	1 27.4	100
35	0.5	47	0 51.0	145	81	0.2	247	1 27.7	99
36	0.5	48	0 52.2	144	82	0.2	278	1 27.9	98
37	0.5	48	0 53.4	143	83	0.1	318	1 28.1	97
38	0.6	49	0 54.7	142	84	0.1	370	1 28.3	96
39	0.6	50	0 55.9	141	85	0.1	440	1 28.5	95
40	0.6	50	0 57.1	140	86	0.1	555	1 28.6	94
41	0.6	51	0 58.3	139	87	0.1	740	1 28.7	93
42	0.6	52	0 59.4	138	88	0.0	1110	1 28.7	92
43	0.6	53	1 0.6	137	89	0.0	2220	1 28.8	91
44	0.6	54	1 1.7	136	90	0.0	$\infty$	1 28.8	90
45	0.6	55	1 2.8	135					

 $\Delta \lambda$  has the sign of  $\tan (\lambda - \Omega)$  $a$  has the sign of  $\cos (\Omega - \lambda)$  $B$  has the sign of  $\sin (\Omega - \lambda)$

Date.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	1879.	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Jan. 1		17 47 21.15	- 7.073	20 12 45.1	+ 2.58	1 22 57.2	17 44 58.76	- 5.312	20 12 40.0	- 2.09
2		17 44 53.23	5.256	20 12 42.3	- 2.30	2 22 51.6	17 43 12.68	3.535	20 14 25.3	6.62
3		17 43 8.68	3.465	20 14 33.0	6.85	3 22 46.6	17 42 8.56	1.820	20 17 54.1	10.70
4		17 42 6.38	1.741	20 18 7.4	10.95	4 22 42.3	17 41 44.55	- 0.196	20 22 55.6	14.32
5		17 41 44.36	- 0.112	20 23 14.4	14.54	5 22 38.6	17 41 58.30	+ 1.324	20 29 17.2	17.38
6		17 42 0.17	+ 1.410	20 29 41.0	17.58	6 22 35.5	17 42 47.20	2.732	20 36 45.6	19.69
7		17 42 51.13	2.816	20 37 13.8	20.06	7 22 32.9	17 44 8.48	4.023	20 45 7.5	21.85
8		17 44 14.40	4.104	20 45 39.4	21.98	8 22 30.8	17 45 59.43	5.202	20 54 10.1	23.29
9		17 46 7.24	5.278	20 54 44.9	23.39	9 22 29.1	17 48 17.40	6.277	21 3 41.3	24.23
10		17 48 26.98	6.348	21 4 18.1	24.30	10 22 27.9	17 50 59.95	7.251	21 13 29.8	24.72
11		17 51 11.15	7.316	21 14 7.8	24.75	11 22 27.1	17 54 4.75	8.133	21 23 24.6	24.80
12		17 54 17.41	8.191	21 24 3.0	24.80	12 22 26.5	17 57 29.68	8.931	21 33 16.8	24.49
13		17 57 43.66	8.982	21 33 54.9	24.46	13 22 26.3	18 1 12.84	9.652	21 42 57.2	23.82
14		18 1 27.96	9.697	21 43 34.3	23.77	14 22 26.4	18 5 12.45	10.304	21 52 17.8	22.84
15		18 5 28.57	10.343	21 52 53.4	22.78	15 22 26.7	18 9 26.96	10.895	22 1 12.0	21.60
16		18 9 43.94	10.928	22 1 45.5	21.52	16 22 27.2	18 13 54.96	11.431	22 9 33.8	20.16
17		18 14 12.66	11.456	22 10 4.8	20.05	17 22 27.9	18 18 35.14	11.913	22 17 18.0	18.49
18		18 18 53.45	11.935	22 17 46.3	18.37	18 22 28.8	18 23 26.42	12.353	22 24 19.7	16.61
19		18 23 45.21	12.370	22 24 44.8	16.47	19 22 29.8	18 28 27.76	12.752	22 30 33.7	14.53
20		18 28 46.92	12.765	22 30 55.4	14.38	20 22 31.1	18 33 38.25	13.116	22 35 55.9	12.30
21		18 33 57.68	13.125	22 36 14.0	12.15	21 22 32.5	18 38 57.05	13.447	22 40 23.1	9.95
22		18 39 16.65	13.452	22 40 37.5	9.79	22 22 34.0	18 44 23.43	13.748	22 43 52.5	7.48
23		18 44 43.12	13.750	22 44 3.1	7.32	23 22 35.6	18 49 56.69	14.023	22 46 21.2	4.90
24		18 50 16.40	14.022	22 46 28.0	4.74	24 22 37.3	18 55 36.28	14.275	22 47 46.7	2.21
25		18 55 55.94	14.271	22 47 40.6	- 2.05	25 22 39.1	19 1 21.65	14.503	22 48 6.8	+ 0.55
26		19 1 41.18	14.497	22 48 5.9	+ 0.71	26 22 41.0	19 7 12.29	14.714	22 47 19.6	3.40
27		19 7 31.64	14.705	22 47 15.0	3.55	27 22 43.0	19 13 7.74	14.906	22 45 23.2	6.21
28		19 13 26.86	14.895	22 45 15.0	6.46	28 22 45.1	19 19 7.65	15.083	22 42 16.1	9.30
29		19 19 26.48	15.070	22 42 4.4	9.44	29 22 47.2	19 25 11.63	15.245	22 37 56.7	12.33
30		19 25 30.11	15.230	22 37 41.7	12.46	30 22 49.4	19 31 19.33	15.394	22 32 24.0	15.41
31		19 31 37.44	15.377	22 32 5.8	15.54	31 22 51.6	19 37 30.47	15.531	22 25 36.4	18.55
Feb. 1		19 37 48.15	15.513	22 25 15.2	18.67	1 22 53.9	19 43 44.75	15.659	22 17 33.3	21.72
2		19 44 1.99	15.639	22 17 9.3	21.83	2 22 56.2	19 50 1.97	15.775	22 8 13.4	24.94
3		19 50 18.72	15.754	22 7 46.9	25.04	3 22 58.6	19 56 21.86	15.882	21 57 35.9	28.19
4		19 56 38.09	15.860	21 57 7.1	28.28	4 23 1.0	20 2 44.20	15.981	21 45 40.1	31.47
5		20 2 59.89	15.958	21 45 9.2	31.55	5 23 3.5	20 9 8.82	16.072	21 32 25.2	34.78
6		20 9 23.94	16.048	21 31 52.5	34.85	6 23 6.0	20 15 35.58	16.157	21 17 50.6	38.12
7		20 15 50.11	16.132	21 17 16.3	38.18	7 23 8.5	20 22 4.29	16.235	21 1 55.4	41.47
8		20 22 18.21	16.209	21 1 19.9	41.52	8 23 11.1	20 28 34.82	16.308	20 44 39.6	44.85
9		20 28 48.10	16.281	20 44 3.1	44.89	9 23 13.6	20 35 7.04	16.375	20 26 2.3	48.25
10		20 35 19.67	16.348	20 25 25.1	48.28	10 23 16.2	20 41 40.85	16.440	20 6 3.1	51.68
11		20 41 52.81	16.412	20 5 25.5	51.69	11 23 18.9	20 48 16.15	16.499	19 44 41.8	55.11
12		20 48 27.43	16.471	19 44 4.0	55.11	12 23 21.6	20 54 52.85	16.557	19 21 57.8	58.56
13		20 55 3.44	16.528	19 21 20.3	58.54	13 23 24.2	21 1 30.89	16.611	18 57 51.0	62.01
14		21 1 40.77	16.582	18 57 14.1	61.98	14 23 26.9	21 8 10.19	16.663	18 32 21.1	65.45
15		21 8 19.35	16.633	18 31 45.1	65.44	15 23 29.7	21 14 50.71	16.712	18 5 27.8	68.96
16		21 14 59.14	16.682	18 4 53.0	68.90	16 23 32.4	21 21 32.41	16.761	17 37 11.0	72.44
17		21 21 40.10	16.730	17 36 37.7	72.37	17 23 35.2	21 28 15.25	16.808	17 7 30.6	75.92
18		21 28 22.19	16.777	17 6 59.2	75.84	18 23 38.0	21 34 59.22	16.855	16 36 26.3	79.42
19		21 35 5.40	16.823	16 35 57.2	79.32	19 23 40.8	21 41 44.30	16.901	16 3 68.3	82.90
20		21 41 49.71	16.869	16 3 31.8	82.79	20 23 43.6	21 48 30.50	16.948	15 30 6.8	86.39
21		21 48 35.13	16.915	15 29 43.2	86.26	21 23 46.4	21 55 17.80	16.994	14 54 51.6	89.87
22		21 55 21.64	16.961	14 54 31.3	89.73	22 23 49.3	22 2 6.22	17.040	14 18 13.1	93.34
23		22 2 9.26	17.007	14 17 56.4	93.18	23 23 52.1	22 8 55.76	17.088	13 0 11.6	96.79
24		22 8 57.99	17.054	13 39 58.8	96.62	24 23 55.0	22 15 46.44	17.136	13 40 47.1	100.23
25		22 15 47.85	17.102	13 0 38.8	100.04	25 23 58.0	22 22 38.28	17.184	12 20 0.6	103.62
26		22 22 38.86	17.150	12 10 57.1	103.42					
27		22 29 31.02	17.198	11 37 54.6	106.78	27 0 0.9	22 29 31.27	17.233	11 37 53.0	107.00
28		22 36 24.34	17.246	10 54 31.9	110.10	28 0 3.8	22 36 25.44	17.281	10 54 24.8	110.33
29		22 43 18.82	+ 17.294	- 10 9 50.1	+ 113.36	29 0 6.8	22 43 20.78	+ 17.330	- 10 9 37.2	+ 113.61

Date. 1879.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Mar. 1	22 43 18.82	+17.294	-10 9 50.1	+113.36	1 0 6.8	22 43 20.78	+17.330	-10 9 37.2	+113.61	
2	22 50 14.44	17.341	9 23 51.0	116.55	2 0 9.8	22 50 17.27	17.377	9 23 32.0	116.81	
3	22 57 11.16	17.386	8 36 36.2	119.66	3 0 12.8	22 57 14.87	17.423	8 46 10.7	119.94	
4	23 4 8.93	17.428	7 48 8.0	122.67	4 0 15.8	23 4 13.53	17.465	7 47 35.7	122.96	
5	23 11 7.66	17.466	6 58 29.0	125.56	5 0 18.9	23 11 13.15	17.503	6 57 49.5	125.86	
6	23 18 7.22	17.497	6 7 42.3	128.30	6 0 21.9	23 18 13.61	17.535	6 6 55.4	128.61	
7	23 25 7.42	17.520	5 15 52.0	130.86	7 0 25.0	23 25 14.72	17.558	5 14 57.5	131.18	
8	23 32 8.05	17.532	4 23 2.5	133.22	8 0 28.1	23 32 16.25	17.569	4 22 0.2	133.54	
9	23 39 8.81	17.530	3 29 19.3	135.33	9 0 31.2	23 39 17.91	17.567	3 28 9.0	135.66	
10	23 46 9.31	17.511	2 34 48.8	137.16	10 0 34.2	23 46 19.29	17.547	2 33 30.6	137.49	
11	23 53 9.10	17.469	1 39 38.3	138.66	11 0 37.3	23 53 19.95	17.504	1 38 12.2	138.99	
12	0 0 7.60	17.401	-0 43 56.2	139.78	12 0 40.3	0 0 19.29	17.435	-0 42 22.3	140.10	
13	0 7 4.15	17.304	+0 12 7.7	140.47	13 0 43.3	0 7 16.64	17.336	+0 13 49.1	140.77	
14	0 13 57.92	17.171	1 8 22.7	140.70	14 0 46.3	0 14 11.17	17.201	1 10 11.2	140.98	
15	0 20 48.03	16.998	2 4 37.1	140.41	15 0 49.2	0 21 1.96	17.025	2 6 32.2	140.67	
16	0 27 33.48	16.780	3 0 37.8	139.55	16 0 52.0	0 27 48.01	16.803	3 2 38.7	139.78	
17	0 34 13.06	16.510	3 56 10.7	138.09	17 0 54.7	0 34 28.11	16.529	3 58 16.5	138.28	
18	0 40 45.54	16.187	4 51 1.1	136.01	18 0 57.3	0 41 1.00	16.201	4 53 10.9	136.15	
19	0 47 9.50	15.805	5 44 53.9	133.27	19 0 59.8	0 47 25.30	15.814	5 47 6.5	133.36	
20	0 53 23.69	15.362	6 37 32.9	129.88	20 1 2.1	0 53 39.57	15.365	6 39 47.2	129.92	
21	0 59 26.44	14.858	7 28 42.8	125.84	21 1 4.2	0 59 42.32	14.855	7 30 57.3	125.82	
22	1 5 16.35	14.291	8 18 8.2	121.16	22 1 6.1	1 5 32.07	14.281	8 20 21.6	121.10	
23	1 10 51.88	13.660	9 5 34.4	115.91	23 1 7.7	1 11 7.28	13.643	9 7 45.1	115.77	
24	1 16 11.54	12.969	9 50 47.2	110.07	24 1 9.0	1 16 26.45	12.945	9 52 53.8	109.87	
25	1 21 13.93	12.221	10 33 33.6	103.72	25 1 10.1	1 21 28.19	12.191	10 35 34.7	103.47	
26	1 25 57.71	11.418	11 13 41.7	96.89	26 1 10.9	1 26 11.19	11.383	11 15 36.1	96.59	
27	1 30 21.60	10.565	11 51 0.7	89.63	27 1 11.3	1 30 34.15	10.525	11 52 47.1	89.28	
28	1 34 24.45	9.666	12 25 20.7	81.98	28 1 11.4	1 34 35.94	9.621	12 26 58.1	81.59	
29	1 38 5.23	8.726	12 56 33.0	74.00	29 1 11.2	1 38 15.56	8.676	12 58 0.6	73.58	
30	1 41 23.01	7.750	13 24 30.2	65.72	30 1 10.5	1 41 32.09	7.697	13 25 47.2	65.27	
31	1 44 17.02	6.746	13 49 5.5	57.18	31 1 9.4	1 44 24.80	6.691	13 50 11.4	56.71	
Apr. 1	1 46 46.67	5.721	14 10 13.2	48.42	1 1 8.0	1 46 53.13	5.665	14 11 7.8	47.94	
2	1 48 51.50	4.680	14 27 48.4	39.48	2 1 6.1	1 48 56.64	4.625	14 28 31.7	39.01	
3	1 50 31.24	3.632	14 41 47.0	30.38	3 1 3.8	1 50 35.08	3.578	14 42 19.1	29.93	
4	1 51 45.83	2.585	14 52 5.8	21.17	4 1 1.1	1 51 48.44	2.534	14 52 27.1	20.74	
5	1 52 35.42	1.550	14 58 42.6	11.90	5 0 58.0	1 52 36.90	1.504	14 58 53.9	11.50	
6	1 53 0.43	+0.538	15 1 37.0	+2.62	6 0 54.4	1 53 0.90	+0.499	15 1 39.3	+2.26	
7	1 53 1.53	-0.440	15 0 48.9	-6.62	7 0 50.5	1 53 1.15	-0.471	15 0 43.2	-6.92	
8	1 52 39.67	1.373	14 56 20.5	15.71	8 0 46.2	1 52 38.60	1.396	14 56 8.3	15.95	
9	1 51 56.10	2.247	14 48 16.6	24.56	9 0 41.5	1 51 54.53	2.263	14 47 50.5	24.73	
10	1 50 52.38	3.050	14 36 44.1	33.09	10 0 36.5	1 50 50.51	3.058	14 36 23.9	33.18	
11	1 49 30.37	3.769	14 21 51.5	41.19	11 0 31.2	1 49 28.40	3.769	14 21 30.3	41.20	
12	1 47 52.20	4.394	14 3 51.7	48.71	12 0 25.6	1 47 50.32	4.387	14 3 30.8	48.65	
13	1 46 0.27	4.915	13 42 59.4	55.53	13 0 19.8	1 45 58.64	4.902	13 42 40.9	55.40	
14	1 43 57.15	5.325	13 19 32.6	61.55	14 0 13.9	1 43 55.91	5.307	13 19 18.2	61.35	
15	1 41 45.61	5.616	12 53 52.4	66.65	15 0 7.8	1 41 44.88	5.594	12 53 43.6	66.39	
16	1 39 28.51	5.789	12 26 21.5	70.75	16 0 1.6	1 39 28.36	5.764	12 26 19.6	70.45	
17	1 37 8.69	5.841	11 57 25.1	73.77	16 23 55.4	1 37 9.14	5.815	11 57 30.8	73.45	
18	1 34 49.06	5.776	11 27 29.6	75.67	17 23 49.1	1 34 50.11	5.752	11 27 43.3	75.34	
19	1 32 32.32	5.602	10 57 2.1	76.44	18 23 42.9	1 32 33.92	5.580	10 57 23.9	76.12	
20	1 30 21.01	5.324	10 26 29.4	76.10	19 23 36.8	1 30 23.07	5.307	10 26 58.8	75.80	
21	1 28 17.49	4.955	9 56 17.6	74.71	20 23 30.8	1 28 19.90	4.943	9 56 53.9	74.44	
22	1 26 23.83	4.504	9 26 51.1	72.34	21 23 25.0	1 26 26.46	4.498	9 27 33.3	72.12	
23	1 24 41.87	3.983	8 58 32.6	69.07	22 23 19.4	1 24 44.58	3.983	8 59 19.4	68.91	
24	1 23 13.11	3.406	8 31 41.9	65.03	23 23 14.0	1 23 15.73	3.415	8 32 31.9	64.93	
25	1 21 58.75	2.783	8 6 36.4	60.32	24 23 8.8	1 22 1.13	2.796	8 7 28.0	60.28	
26	1 20 59.70	2.196	7 43 31.0	55.05	25 23 3.9	1 21 1.79	2.145	7 44 22.7	55.08	
27	1 20 16.89	1.446	7 22 37.4	49.36	26 22 59.2	1 20 18.37	1.470	7 23 27.5	49.45	
28	1 19 50.50	0.751	7 4 4.5	43.34	27 22 54.8	1 19 51.34	0.780	7 4 51.8	43.49	
29	1 19 40.89	-0.049	6 47 59.1	37.08	28 22 50.7	1 19 40.97	-0.082	6 48 42.1	37.28	
30	1 19 48.12	+0.652	6 34 25.8	30.69	29 22 46.9	1 19 47.35	+0.615	6 35 3.4	30.94	
31	1 20 12.11	+1.346	6 23 26.6	-24.24	30 22 43.4	1 20 10.41	1.306	6 23 57.8	24.53	
					31 22 40.1	1 20 49.98	+1.989	6 15 26.3	-19.10	

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	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
May 1	1 20 12.11	+ 1.346	6 23 26.6	-24.24	1 22 40.1	1 20 49.98	+ 1.989	6 15 26.3	-18.10
2	1 20 52.66	2.031	6 15 2.4	17.78	2 22 37.1	1 21 45.78	2.658	6 9 28.5	11.74
3	1 21 49.49	2.702	6 9 12.5	11.40	3 22 34.4	1 22 57.46	3.312	6 6 2.1	- 5.47
4	1 23 2.23	3.357	6 5 54.6	- 5.11	4 22 31.9	1 24 24.62	3.948	6 5 4.8	+ 0.67
5	1 24 30.47	3.993	6 5 6.1	+ 1.04	5 22 29.7	1 26 6.84	4.565	6 6 32.9	6.64
6	1 26 13.76	4.610	6 6 43.3	7.02	6 22 27.7	1 28 3.65	5.164	6 10 22.3	12.44
7	1 28 11.64	5.208	6 10 41.8	12.82	7 22 25.9	1 30 14.58	5.744	6 16 28.5	18.04
8	1 30 23.63	5.788	6 16 57.1	18.42	8 22 24.4	1 32 39.20	6.305	6 24 46.5	23.43
9	1 32 49.30	6.348	6 25 24.2	23.80	9 22 23.1	1 35 17.08	6.848	6 35 11.4	28.61
10	1 35 28.20	6.890	6 35 58.0	28.97	10 22 22.0	1 38 7.79	7.375	6 47 38.1	33.57
11	1 38 19.89	7.415	6 48 33.3	33.92	11 22 21.1	1 41 10.94	7.885	7 2 1.1	38.31
12	1 41 23.98	7.923	7 3 4.6	38.65	12 22 20.4	1 44 26.15	8.381	7 18 15.6	42.84
13	1 44 40.10	8.418	7 19 27.0	43.16	13 22 19.9	1 47 53.10	8.864	7 36 15.8	47.15
14	1 48 7.93	8.900	7 37 34.8	47.46	14 22 19.6	1 51 31.51	9.335	7 55 56.9	51.25
15	1 51 47.17	9.369	7 57 23.0	51.53	15 22 19.5	1 55 21.09	9.796	8 17 13.7	55.13
16	1 55 37.54	9.828	8 18 46.4	55.39	16 22 19.6	1 59 21.65	10.249	8 40 1.4	58.81
17	1 59 38.84	10.279	8 41 40.2	59.05	17 22 19.8	2 3 32.99	10.696	9 4 14.9	62.28
18	2 3 50.88	10.724	9 5 59.2	62.50	18 22 20.2	2 7 54.98	11.138	9 29 49.4	65.55
19	2 8 13.53	11.164	9 31 38.6	65.75	19 22 20.8	2 12 27.52	11.576	9 56 40.0	68.63
20	2 12 46.68	11.600	9 58 33.6	68.80	20 22 21.6	2 17 10.57	12.012	10 24 41.9	71.50
21	2 17 30.29	12.034	10 26 39.3	71.65	21 22 22.5	2 22 4.06	12.447	10 53 50.5	74.17
22	2 22 24.30	12.467	10 55 51.0	74.29	22 22 23.6	2 27 8.03	12.885	11 24 0.6	76.64
23	2 27 28.74	12.903	11 26 3.7	76.74	23 22 24.9	2 32 22.56	13.326	11 55 7.7	78.91
24	2 32 43.68	13.342	11 57 12.7	78.98	24 22 26.4	2 37 47.69	13.770	12 27 6.8	80.98
25	2 38 9.18	13.784	12 29 13.1	81.02	25 22 28.1	2 43 23.58	14.220	12 59 53.1	82.83
26	2 43 45.37	14.232	13 1 59.9	82.84	26 22 29.9	2 49 10.35	14.677	13 33 21.1	84.46
27	2 49 32.39	14.687	13 35 27.7	84.44	27 22 31.9	2 55 8.19	15.143	14 7 25.3	85.85
28	2 55 30.41	15.150	14 9 31.1	85.80	28 22 34.1	3 1 17.31	15.618	14 42 0.0	87.00
29	3 1 39.66	15.622	14 44 4.3	86.92	29 22 36.5	3 7 37.93	16.102	15 16 59.3	87.90
30	3 8 0.32	16.102	15 19 1.5	87.79	30 22 39.1	3 14 10.26	16.595	15 52 17.0	88.52
31	3 14 32.63	16.592	15 54 16.2	88.38	31 22 41.9	3 20 54.57	17.099	16 27 46.0	88.74
June 1	3 21 16.81	17.092	16 29 41.4	88.67	1 22 44.9	3 27 51.07	17.611	17 3 18.9	88.85
2	3 28 13.09	17.600	17 5 9.9	88.65	2 22 48.1	3 34 59.96	18.132	17 38 48.1	88.52
3	3 35 21.66	18.116	17 40 34.0	88.29	3 22 51.5	3 42 21.44	18.659	18 14 5.0	87.82
4	3 42 42.71	18.638	18 15 45.0	87.56	4 22 55.1	3 49 55.63	19.191	18 49 0.3	86.72
5	3 50 16.34	19.165	18 50 33.8	86.44	5 22 58.9	3 57 42.60	19.724	19 23 24.2	85.20
6	3 58 2.63	19.692	19 24 50.6	84.90	6 23 2.9	4 5 42.34	20.255	19 57 6.2	83.24
7	4 6 1.55	20.217	19 58 25.0	82.92	7 23 7.2	4 13 54.75	20.778	20 29 55.6	80.80
8	4 14 12.98	20.734	20 31 6.4	80.46	8 23 11.7	4 22 19.69	21.289	21 1 40.3	77.85
9	4 22 36.68	21.238	21 2 42.7	77.50	9 23 16.4	4 30 56.46	21.780	21 32 8.5	74.39
10	4 31 12.25	21.723	21 33 2.3	74.04	10 23 21.2	4 39 44.80	22.245	22 1 7.4	70.42
11	4 39 59.15	22.181	22 1 52.7	70.07	11 23 26.2	4 48 43.95	22.676	22 28 24.8	65.94
12	4 48 56.66	22.605	22 29 1.7	65.60	12 23 31.4	4 57 52.93	23.065	22 53 48.5	60.94
13	4 58 3.87	22.988	22 54 17.3	60.62	13 23 36.8	5 7 10.69	23.406	23 17 6.3	55.46
14	5 7 19.73	23.324	23 17 27.7	55.17	14 23 42.2	5 16 36.00	23.691	23 38 7.5	49.55
15	5 16 43.00	23.604	23 38 22.1	49.29	15 23 47.8	5 26 7.39	23.915	23 56 41.9	43.26
16	5 26 12.25	23.824	23 56 50.7	43.04	16 23 53.4	5 35 43.39	24.073	24 12 41.3	36.64
17	5 35 46.02	23.979	24 12 45.3	36.46	17 23 59.1	5 45 22.35	24.161	24 25 58.5	29.77
18	5 45 22.70	24.066	24 25 58.9	29.64					
19	5 55 0.65	24.085	24 36 26.7	22.66	19 0 4.8	5 55 2.59	24.180	24 36 28.5	22.73
20	6 4 38.25	24.037	24 44 5.6	15.57	20 0 10.5	6 4 42.47	24.131	24 44 8.3	15.58
21	6 14 13.91	23.923	24 48 54.1	8.48	21 0 16.2	6 14 20.37	24.015	24 48 56.4	8.43
22	6 23 46.08	23.748	24 50 52.9	+ 1.44	22 0 21.8	6 23 54.72	23.837	24 50 53.4	+ 1.34
23	6 33 13.36	23.516	24 50 4.2	- 5.47	23 0 27.4	6 33 24.06	23.600	24 50 1.7	- 5.62
24	6 42 34.45	23.224	24 46 31.9	12.19	24 0 32.8	6 42 47.14	23.313	24 46 25.2	12.38
25	6 51 48.22	22.907	24 40 20.8	18.68	25 0 38.1	6 52 2.75	22.981	24 40 8.8	18.91
26	7 0 53.67	22.541	24 31 37.1	24.91	26 0 43.2	7 1 9.91	22.609	24 31 19.0	25.18
27	7 9 49.94	22.144	24 20 27.5	30.84	27 0 48.2	7 10 7.74	22.206	24 20 2.7	31.14
28	7 18 36.35	21.720	24 6 59.4	36.44	28 0 53.1	7 18 55.56	21.776	24 6 27.2	36.76
29	7 27 12.32	21.275	23 51 21.0	41.71	29 0 57.8	7 27 32.79	21.324	23 50 40.8	42.05
30	7 35 37.43	20.815	23 33 40.0	46.65	30 1 2.2	7 35 59.01	20.858	23 32 51.5	47.00
31	7 43 51.34	+20.343	+23 14 4.7	-51.24	31 1 6.5	7 44 13.88	+20.381	+23 13 7.8	-51.59

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July	1	h m s 7 43 51.34	+20.343	+23 14 4.7	-51.24	d h m 1 1 6.5	h m s 7 44 13.88	+20.381	+23 13 7.8	-51.59	
	2	7 51 53.81	19.863	22 52 43.1	55.50	2 1 10.6	7 52 17.18	19.895	22 51 37.7	55.85	
	3	7 59 44.70	19.378	22 29 43.5	59.42	3 1 14.6	8 0 8.77	19.404	22 28 29.6	59.77	
	4	8 7 23.92	18.891	22 5 13.7	63.02	4 1 18.3	8 7 48.55	18.912	22 3 51.4	63.36	
	5	8 14 51.46	18.404	21 39 21.2	66.31	5 1 21.8	8 15 16.52	18.423	21 37 50.7	66.65	
	6	8 22 7.33	17.919	21 12 13.3	69.30	6 1 25.1	8 22 32.72	17.930	21 10 34.9	69.63	
	7	8 29 11.60	17.437	20 43 57.0	72.00	7 1 28.2	8 29 37.21	17.444	20 42 11.1	72.31	
	8	8 36 4.32	16.958	20 14 39.3	74.42	8 1 31.1	8 36 30.06	16.962	20 12 46.2	74.71	
	9	8 42 45.62	16.484	19 44 26.8	76.58	9 1 33.9	8 43 11.39	16.484	19 42 26.9	76.85	
	10	8 49 15.59	16.015	19 13 25.7	78.47	10 1 36.4	8 49 41.30	16.011	19 11 19.5	78.72	
	11	8 55 34.35	15.550	18 41 42.1	80.12	11 1 38.8	8 55 59.93	15.542	18 39 30.1	80.35	
	12	9 1 42.01	15.089	18 9 21.7	81.54	12 1 41.0	9 2 7.38	15.078	18 7 4.5	81.75	
	13	9 7 38.67	14.633	17 36 30.2	82.72	13 1 43.0	9 8 3.76	14.620	17 34 8.3	82.90	
	14	9 13 24.43	14.180	17 3 12.8	83.68	14 1 44.8	9 13 49.17	14.164	17 0 46.7	83.24	
	15	9 18 59.33	13.730	16 29 35.2	84.42	15 1 46.4	9 19 23.66	13.712	16 27 5.5	84.56	
	16	9 24 23.47	13.282	15 55 42.2	84.95	16 1 47.8	9 24 47.33	13.261	15 53 9.5	85.07	
	17	9 29 36.90	12.835	15 21 39.0	85.28	17 1 49.1	9 30 0.22	12.811	15 19 3.9	85.37	
	18	9 34 39.58	12.388	14 47 30.5	85.40	18 1 50.2	9 35 2.31	12.362	14 44 53.6	85.46	
	19	9 39 31.54	11.942	14 13 21.5	85.32	19 1 51.1	9 39 53.63	11.914	14 10 43.6	85.35	
	20	9 44 12.76	11.492	13 39 17.1	85.02	20 1 51.9	9 44 34.16	11.462	13 36 38.7	85.03	
	21	9 48 43.14	11.039	13 5 22.0	84.53	21 1 52.4	9 49 3.79	11.007	13 2 43.7	84.51	
	22	9 53 2.61	10.581	12 31 41.4	83.83	22 1 52.7	9 53 22.46	10.547	12 29 3.9	83.79	
	23	9 57 11.01	10.117	11 58 19.9	82.92	23 1 52.9	9 57 30.02	10.081	11 55 43.8	82.85	
	24	10 1 8.18	9.646	11 25 22.7	81.81	24 1 52.9	10 1 26.31	9.608	11 22 48.7	81.71	
	25	10 4 53.97	9.166	10 52 54.9	80.47	25 1 52.7	10 5 11.17	9.126	10 50 23.9	80.34	
	26	10 8 28.09	8.675	10 21 1.9	78.91	26 1 52.4	10 8 44.31	8.633	10 18 34.2	78.75	
	27	10 11 50.26	8.171	9 49 49.2	77.12	27 1 51.8	10 12 5.46	8.128	9 47 25.6	76.93	
	28	10 15 0.20	7.654	9 19 22.4	75.07	28 1 51.0	10 15 14.34	7.609	9 17 3.7	74.85	
	29	10 17 57.53	7.121	8 49 47.8	72.77	29 1 50.0	10 18 10.57	7.074	8 47 34.6	72.53	
	30	10 20 41.85	6.570	8 21 11.4	70.22	30 1 48.8	10 20 53.74	6.521	8 19 4.3	69.95	
	31	10 23 12.73	6.000	7 53 39.4	67.38	31 1 47.3	10 23 23.44	5.950	7 51 39.0	67.09	
Aug.	1	10 25 29.71	5.411	7 27 19.2	64.25	1 1 45.6	10 25 39.21	5.360	7 25 26.2	63.94	
	2	10 27 32.27	4.799	7 2 17.7	60.82	2 1 43.7	10 27 40.54	4.747	7 0 32.7	60.48	
	3	10 29 19.87	4.164	6 38 42.3	57.06	3 1 41.6	10 29 26.90	4.112	6 37 5.8	56.70	
	4	10 30 51.97	3.506	6 16 41.4	52.96	4 1 39.1	10 30 57.74	3.454	6 15 14.0	52.57	
	5	10 32 7.98	2.823	5 56 23.0	48.52	5 1 36.4	10 32 12.50	2.772	5 55 5.1	48.11	
	6	10 33 7.28	2.116	5 37 55.6	43.70	6 1 33.5	10 33 10.56	2.066	5 36 47.7	43.28	
	7	10 33 49.35	1.385	5 21 28.5	38.50	7 1 30.2	10 33 51.41	1.336	5 20 30.8	38.07	
	8	10 34 13.59	+ 0.632	5 7 10.7	32.91	8 1 26.7	10 34 14.50	+ 0.585	5 6 23.4	32.48	
	9	10 34 19.55	- 0.141	4 55 11.7	26.94	9 1 22.8	10 34 19.35	- 0.185	4 54 34.7	26.51	
	10	10 34 6.70	0.930	4 45 40.5	20.59	10 1 18.6	10 34 5.46	0.971	4 45 13.7	20.17	
	11	10 33 34.81	1.729	4 38 46.5	13.86	11 1 14.2	10 33 32.65	1.765	4 38 29.6	13.46	
	12	10 32 43.68	2.533	4 34 38.2	- 6.78	12 1 9.4	10 32 40.73	2.563	4 34 30.5	- 6.41	
	13	10 31 33.27	3.332	4 33 23.3	+ 0.59	13 1 4.3	10 31 29.69	3.355	4 33 24.0	+ 0.92	
	14	10 30 3.86	4.115	4 35 8.5	8.21	14 0 58.9	10 29 59.81	4.130	4 35 16.6	8.49	
	15	10 28 15.96	4.870	4 39 58.7	15.99	15 0 53.1	10 28 11.64	4.877	4 40 12.9	16.21	
	16	10 26 10.42	5.583	4 47 56.7	23.84	16 0 47.1	10 26 6.03	5.581	4 48 15.5	23.99	
	17	10 23 48.44	6.237	4 59 2.8	31.65	17 0 40.8	10 23 44.19	6.227	4 59 24.4	31.73	
	18	10 21 11.68	6.813	5 13 14.3	39.26	18 0 34.3	10 21 7.74	6.795	5 13 36.8	39.26	
	19	10 18 22.18	7.294	5 30 24.4	46.52	19 0 27.5	10 18 18.82	7.269	5 30 45.9	46.44	
	20	10 15 22.45	7.662	5 50 23.2	53.27	20 0 20.6	10 15 19.82	7.630	5 50 41.6	53.10	
	21	10 12 15.44	7.898	6 12 55.9	59.33	21 0 13.6	10 12 13.65	7.861	6 13 9.4	59.09	
	22	10 9 4.49	7.989	6 37 44.2	64.54	22 0 6.5	10 9 3.62	7.950	6 37 51.2	64.25	
	23	10 5 53.24	7.921	7 4 25.8	68.74	23 23 59.4	10 5 53.32	7.883	7 4 25.1	68.41	
	24	10 2 45.62	7.685	7 32 35.0	71.83	24 23 45.5	9 59 47.45	7.251	8 1 26.3	73.33	
	25	9 59 45.69	7.280	8 1 44.1	73.69	25 23 38.8	9 56 59.90	6.685	8 30 55.8	73.93	
	26	9 56 57.52	6.706	8 31 22.1	74.27	26 23 32.3	9 54 27.83	5.962	9 0 24.5	73.26	
	27	9 54 25.06	5.972	9 0 58.5	73.55	27 23 26.2	9 52 14.95	5.088	9 29 22.0	71.34	
	28	9 52 12.07	5.086	9 30 2.4	71.57	28 23 20.4	9 50 24.67	4.078	9 57 18.9	68.21	
	29	9 50 21.98	4.064	9 58 4.0	68.37	29 23 15.0	9 49 0.00	2.952	10 23 46.9	63.94	
	30	9 48 57.80	2.926	10 24 34.9	64.02	30 23 10.2	9 48 3.53	1.736	10 48 20.1	58.65	
	31	9 48 2.10	- 1.698	+ 10 49 8.9	+ 58.64	31 23 5.8	9 47 37.25	- 0.443	+ 11 10 35.1	+ 52.45	

Date.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
1879.										
Sept. 1	<sup>h</sup> 9 <sup>m</sup> 47 <sup>s</sup> 36.87	- 0.394	+ 11° 11' 22.5	+ 52.35	<sup>d</sup> 1 <sup>h</sup> 23 <sup>m</sup> 2.0	<sup>h</sup> 9 <sup>m</sup> 47 <sup>s</sup> 42.70	+ 0.904	+ 11° 30' 11.4	+ 45.44	
2	9 47 43.61	+ 0.962	11 30 55.3	45.25	2 22 58.7	9 48 20.90	2.282	11 46 50.9	37.70	
3	9 48 23.28	2.346	11 47 29.3	37.47	3 22 55.9	9 49 32.28	3.667	12 0 18.2	29.46	
4	9 49 36.26	3.735	12 0 49.5	29.13	4 22 53.8	9 51 16.84	5.043	12 10 21.3	20.73	
5	9 51 22.48	5.112	12 10 44.0	20.35	5 22 52.1	9 53 34.09	6.389	12 16 50.6	11.66	
6	9 53 41.39	6.457	12 17 3.5	11.24	6 22 51.0	9 56 23.11	7.687	12 19 39.2	+ 2.35	
7	9 56 32.01	7.752	12 19 41.6	+ 1.90	7 22 50.4	9 59 42.59	8.924	12 18 42.6	- 7.08	
8	9 59 52.99	8.984	12 18 34.0	- 7.54	8 22 50.2	10 3 30.88	10.087	12 13 59.0	16.55	
9	10 3 42.64	10.140	12 13 39.4	17.00	9 22 50.5	10 7 46.06	11.164	12 5 29.0	25.93	
10	10 7 59.02	11.209	12 4 58.7	26.36	10 22 51.2	10 12 25.98	12.148	11 53 16.1	35.12	
11	10 12 39.93	12.184	11 52 35.6	35.52	11 22 52.3	10 17 28.34	13.031	11 37 25.7	44.04	
12	10 17 43.05	13.058	11 36 35.8	44.40	12 22 53.8	10 22 50.68	13.813	11 16 5.6	52.58	
13	10 23 5.93	13.831	11 17 7.4	52.90	13 22 55.5	10 28 30.55	14.492	10 55 25.5	60.68	
14	10 28 46.13	14.501	10 54 20.2	60.95	14 22 57.5	10 34 25.47	15.069	10 29 37.0	68.27	
15	10 34 41.17	15.070	10 28 25.8	68.49	15 22 59.6	10 40 33.08	15.549	10 0 52.7	75.31	
16	10 40 48.71	15.543	9 59 37.0	75.48	16 23 2.0	10 46 51.15	15.940	9 29 26.7	81.75	
17	10 47 6.54	15.927	9 28 7.7	81.86	17 23 4.5	10 53 17.53	16.245	8 55 33.2	87.59	
18	10 53 32.54	16.227	8 54 12.3	87.65	18 23 7.1	10 59 50.35	16.476	8 19 27.2	92.81	
19	11 0 4.86	16.454	8 18 5.5	92.82	19 23 9.7	11 6 27.86	16.642	7 41 23.1	97.42	
20	11 6 41.78	16.616	7 40 1.6	97.39	20 23 12.5	11 13 8.61	16.746	7 1 35.5	101.44	
21	11 13 21.85	16.717	7 0 15.3	101.37	21 23 15.2	11 19 51.28	16.802	6 20 18.2	104.90	
22	11 20 3.79	16.771	6 19 0.1	104.80	22 23 18.0	11 26 34.79	16.817	5 37 44.3	107.84	
23	11 26 46.53	16.785	5 36 29.0	107.71	23 23 20.8	11 33 18.23	16.797	4 54 5.8	110.28	
24	11 33 29.18	16.765	4 52 53.9	110.13	24 23 23.5	11 40 0.85	16.751	4 9 34.3	112.28	
25	11 40 11.01	16.718	4 8 26.2	112.11	25 23 26.3	11 46 42.10	16.683	3 24 19.8	113.86	
26	11 46 51.46	16.650	3 23 15.9	113.68	26 23 29.0	11 53 21.52	16.600	2 38 31.9	115.07	
27	11 53 30.08	16.567	2 37 32.5	114.88	27 23 31.6	11 59 58.77	16.503	1 52 19.1	115.94	
28	12 0 6.55	16.471	1 51 24.4	115.74	28 23 34.3	12 6 33.63	16.400	1 5 49.0	116.51	
29	12 6 40.63	16.368	1 4 59.2	116.31	29 23 36.9	12 13 5.94	16.292	+ 0 19 8.8	116.82	
30	12 13 12.21	16.261	+ 0 18 23.8	116.61	30 23 39.4	12 19 35.62	16.182	- 0 27 35.8	116.88	
Oct. 1	12 19 41.16	16.152	- 0 28 15.8	116.67	1 23 41.9	12 26 2.66	16.072	1 14 19.3	116.71	
2	12 26 7.49	16.043	1 14 54.4	116.51	2 23 44.4	12 32 27.06	15.963	2 0 56.5	116.36	
3	12 32 31.21	15.935	2 1 26.7	116.15	3 23 46.8	12 38 48.90	15.857	2 47 23.2	115.83	
4	12 38 52.39	15.830	2 47 48.7	115.64	4 23 49.2	12 45 8.25	15.756	3 33 35.6	115.17	
5	12 45 11.09	15.730	3 33 56.4	114.98	5 23 51.5	12 51 25.23	15.660	4 19 30.3	114.36	
6	12 51 27.45	15.634	4 19 46.5	114.18	6 23 53.8	12 57 39.97	15.569	5 5 4.1	113.43	
7	12 57 41.58	15.544	5 5 15.8	113.25	7 23 56.1	13 3 52.60	15.485	5 50 14.0	112.38	
8	13 3 53.62	15.460	5 50 21.4	112.21	8 23 58.3	13 10 3.27	15.406	6 34 57.8	111.24	
9	13 10 3.71	15.382	6 35 1.0	111.07						
10	13 16 12.00	15.310	7 19 12.1	109.84	10 0 0.5	13 16 12.12	15.334	7 19 13.0	110.00	
11	13 22 18.66	15.246	8 2 52.7	108.53	11 0 2.7	13 22 19.33	15.269	8 2 57.5	108.69	
12	13 28 23.84	15.187	8 46 1.0	107.15	12 0 4.8	13 28 25.06	15.210	8 46 9.8	107.30	
13	13 34 27.68	15.134	9 28 35.2	105.69	13 0 6.9	13 34 29.43	15.156	9 28 47.4	105.84	
14	13 40 30.34	15.088	10 10 33.5	104.16	14 0 9.0	13 40 32.61	15.110	10 10 49.2	104.30	
15	13 46 31.97	15.048	10 51 54.4	102.57	15 0 11.1	13 46 34.76	15.070	10 52 13.4	102.70	
16	13 52 32.71	15.014	11 32 36.5	100.93	16 0 13.2	13 52 36.01	15.035	11 32 58.7	101.05	
17	13 58 32.70	14.986	12 12 38.5	99.23	17 0 15.2	13 58 36.51	15.007	12 13 3.7	99.35	
18	14 4 32.07	14.962	12 51 58.9	97.47	18 0 17.3	14 4 36.39	14.983	12 52 27.0	97.58	
19	14 10 30.92	14.944	13 30 36.5	95.66	19 0 19.3	14 10 35.74	14.965	13 31 7.3	95.77	
20	14 16 29.41	14.930	14 8 30.0	93.79	20 0 21.4	14 16 34.73	14.951	14 9 3.4	93.89	
21	14 22 27.61	14.920	14 45 38.1	91.88	21 0 23.4	14 22 33.43	14.941	14 46 13.9	91.98	
22	14 28 25.62	14.915	15 21 59.6	89.91	22 0 25.4	14 28 31.94	14.936	15 22 37.7	90.00	
23	14 34 23.54	14.912	15 57 33.4	87.90	23 0 27.5	14 34 30.37	14.933	15 58 13.6	87.98	
24	14 40 21.44	14.913	16 32 18.3	85.83	24 0 29.5	14 40 28.77	14.934	16 33 0.5	85.91	
25	14 46 19.39	14.916	17 6 12.9	83.71	25 0 31.5	14 46 27.22	14.937	17 6 56.9	83.78	
26	14 52 17.42	14.921	17 39 15.9	81.54	26 0 33.5	14 52 25.76	14.942	17 40 1.5	81.60	
27	14 58 15.59	14.927	18 11 26.4	79.32	27 0 35.6	14 58 24.44	14.948	18 12 13.4	79.38	
28	15 4 13.90	14.933	18 42 42.7	77.03	28 0 37.6	15 4 23.26	14.953	18 43 30.9	77.08	
29	15 10 12.36	14.939	19 13 3.6	74.70	29 0 39.6	15 10 22.23	14.960	19 13 52.9	74.74	
30	15 16 10.98	14.944	19 42 28.0	72.32	30 0 41.6	15 16 21.36	14.965	19 43 18.2	72.35	
31	15 22 9.69	+14.947	-20 10 54.3	- 69.87	31 0 43.7	15 22 20.58	+14.968	-20 11 45.2	- 69.89	

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Nov. 1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"	
2	15 28 8.43	+14.947	20 38 21.1	-67.36	1 0 45.7	15 28 19.83	+14.968	20 39 12.5	-67.37	
3	15 34 7.13	14.943	21 4 47.1	64.79	2 0 47.8	15 34 19.03	14.964	21 5 38.7	64.79	
4	15 40 5.66	14.924	21 30 10.6	62.15	3 0 49.8	15 40 18.06	14.954	21 31 2.2	62.15	
5	15 46 3.91	14.918	21 54 30.0	59.46	4 0 51.8	15 46 16.80	14.938	21 55 21.4	59.45	
6	15 52 1.66	14.893	22 17 44.0	56.70	5 0 53.9	15 52 15.03	14.912	22 18 34.8	56.68	
7	15 57 58.70	14.858	22 39 50.9	53.86	6 0 55.9	15 58 12.54	14.877	22 40 41.0	53.83	
8	16 3 54.78	14.812	23 0 48.9	50.96	7 0 57.9	16 4 9.07	14.830	23 1 38.0	50.92	
9	16 9 49.57	14.751	23 20 36.5	47.99	8 0 59.8	16 10 4.28	14.768	23 21 24.3	47.93	
10	16 15 42.69	14.673	23 39 11.9	44.95	9 1 1.8	16 15 57.80	14.689	23 39 58.1	44.88	
11	16 21 33.73	14.576	23 56 33.4	41.83	10 1 3.7	16 21 49.21	14.591	23 57 17.7	41.75	
12	16 27 22.18	14.457	24 12 39.3	38.65	11 1 5.6	16 27 37.98	14.470	24 13 21.4	38.56	
13	16 33 7.45	14.311	24 27 27.9	35.39	12 1 7.4	16 33 23.53	14.321	24 28 7.5	35.28	
14	16 38 48.88	14.135	24 40 57.4	32.06	13 1 9.1	16 39 5.17	14.141	24 41 34.2	31.93	
15	16 44 25.66	13.925	24 53 6.1	28.66	14 1 10.8	16 44 42.10	13.930	24 53 39.8	28.52	
16	16 49 56.97	13.677	25 3 52.2	25.18	15 1 12.4	16 50 13.48	13.678	25 4 22.5	25.03	
17	16 55 21.79	13.384	25 13 14.1	21.63	16 1 13.8	16 55 38.27	13.380	25 13 40.6	21.47	
18	17 0 38.98	13.039	25 21 10.0	18.02	17 1 15.2	17 0 55.32	13.030	25 21 32.5	17.85	
19	17 5 47.21	12.636	25 27 38.7	14.35	18 1 16.4	17 6 3.30	12.622	25 27 56.9	14.17	
20	17 10 45.00	12.168	25 32 38.6	10.62	19 1 17.4	17 11 0.69	12.149	25 32 52.2	10.43	
21	17 15 30.69	11.626	25 36 8.0	6.83	20 1 18.2	17 15 45.86	11.600	25 36 16.8	6.63	
22	17 20 2.39	11.001	25 38 5.8	-2.98	21 1 18.8	17 20 16.85	10.968	25 38 9.6	-2.78	
23	17 24 17.99	10.282	25 38 30.7	+0.92	22 1 19.1	17 24 31.56	10.241	25 38 29.4	+1.13	
24	17 28 15.12	9.460	25 37 21.7	4.86	23 1 19.1	17 28 27.60	9.411	25 37 15.2	5.07	
25	17 31 51.16	8.523	25 34 37.3	8.85	24 1 18.7	17 32 2.37	8.465	25 34 25.6	9.06	
26	17 35 3.22	7.460	25 30 16.6	12.88	25 1 17.9	17 35 12.94	7.394	25 29 59.9	13.08	
27	17 37 48.17	6.262	25 24 18.5	16.96	26 1 16.7	17 37 56.21	6.188	25 23 56.7	17.16	
28	17 40 2.66	4.921	25 16 41.9	21.10	27 1 15.0	17 40 8.84	4.841	25 16 15.4	21.28	
29	17 41 43.21	3.432	25 7 25.1	25.30	28 1 12.7	17 41 47.40	3.347	25 6 54.4	25.45	
30	17 42 46.24	1.796	24 56 27.1	29.55	29 1 9.8	17 42 48.36	+1.710	24 55 52.7	29.69	
Dec. 1	17 43 8.32	+0.021	24 43 46.4	33.87	30 1 6.2	17 43 8.37	-0.063	24 43 9.0	33.98	
2	17 42 46.30	-1.874	24 29 20.8	38.28	1 1 1.8	17 42 44.40	1.951	24 28 41.2	38.34	
3	17 41 37.67	3.857	24 13 8.6	42.73	2 0 56.7	17 41 34.05	3.921	24 12 28.1	42.74	
4	17 39 40.86	5.880	23 55 9.9	47.13	3 0 50.8	17 39 35.90	5.925	23 54 29.9	47.08	
5	17 36 55.66	7.877	23 35 27.2	51.41	4 0 44.2	17 36 49.88	7.898	23 34 49.4	51.29	
6	17 33 23.62	9.768	23 14 4.5	55.46	5 0 36.7	17 33 17.67	9.759	23 13 30.6	55.26	
7	17 29 8.38	11.460	22 51 9.0	59.08	6 0 28.5	17 29 2.95	11.424	22 50 40.9	58.80	
8	17 24 15.89	12.856	22 26 54.9	61.95	7 0 19.8	17 24 11.67	12.793	22 26 34.5	61.60	
9	17 18 54.36	13.867	22 1 44.6	63.74	8 0 10.5	17 18 51.94	13.785	22 1 33.4	63.34	
10	17 13 13.86	14.426	21 36 7.3	64.13	9 0 1.0	17 13 13.63	14.331	21 36 6.3	63.71	
11	17 7 25.79	14.496	21 10 39.2	62.92	9 23 51.3	17 7 27.90	14.402	21 10 48.4	62.52	
12	17 1 41.92	14.078	20 46 0.9	59.98	10 23 41.7	17 1 46.23	13.995	20 46 19.3	59.64	
13	16 56 13.57	13.212	20 22 53.9	55.32	11 23 32.3	16 56 19.68	13.149	20 23 19.5	55.08	
14	16 51 10.75	11.965	20 1 57.5	49.15	12 23 23.4	16 51 18.08	11.929	20 2 27.6	49.03	
15	16 46 41.61	10.423	19 43 44.2	41.78	13 23 15.0	16 46 49.46	10.416	19 44 15.7	41.79	
16	16 42 52.06	8.681	19 28 38.7	33.58	14 23 7.2	16 42 59.73	8.702	19 29 8.3	33.71	
17	16 39 45.82	6.823	19 16 55.5	24.98	15 23 0.2	16 39 52.67	6.873	19 17 20.5	25.22	
18	16 37 24.59	4.942	19 8 39.8	16.35	16 22 53.9	16 37 30.08	5.007	19 8 57.9	16.67	
19	16 35 48.40	3.084	19 3 48.4	8.01	17 22 48.3	16 35 52.12	3.163	19 3 58.1	8.34	
20	16 34 56.03	-1.296	19 2 11.3	+0.19	18 22 43.5	16 34 57.72	-1.384	19 2 11.6	+0.58	
21	16 34 45.37	+0.388	19 3 34.0	-6.94	19 22 39.3	16 34 44.89	+0.296	19 3 24.8	-6.55	
22	16 35 13.74	1.955	19 7 38.3	13.28	20 22 35.8	16 35 11.03	1.863	19 7 19.8	12.90	
23	16 36 18.21	3.395	19 14 5.0	18.80	21 22 32.9	16 36 13.32	3.306	19 13 37.8	18.46	
24	16 37 55.69	4.707	19 22 34.0	23.48	22 22 30.6	16 37 48.71	4.623	19 21 59.1	23.18	
25	16 40 3.17	5.896	19 32 45.9	27.37	23 22 28.8	16 39 54.23	5.818	19 32 4.4	27.12	
26	16 42 37.78	6.970	19 44 21.7	30.50	24 22 27.3	16 42 27.05	6.899	19 43 34.6	30.30	
27	16 45 36.86	7.936	19 57 4.2	32.93	25 22 26.4	16 45 24.51	7.872	19 56 12.9	32.77	
28	16 48 57.91	8.804	20 10 37.4	34.73	26 22 25.8	16 48 44.11	8.747	20 9 42.9	34.62	
29	16 52 38.73	9.584	20 24 46.6	35.95	27 22 25.5	16 52 23.66	9.535	20 23 50.1	35.88	
30	16 56 37.31	10.285	20 39 18.8	36.66	28 22 25.8	17 0 34.75	10.440	20 53 4.6	36.91	
31	17 0 51.87	10.914	20 54 2.4	36.90	29 22 26.3	17 5 2.89	11.454	21 7 49.6	36.78	
32	17 5 20.80	11.484	21 8 46.9	36.74	30 22 27.0	17 9 44.11	11.972	21 22 27.0	36.28	
33	17 10 2.67	+11.997	-21 23 23.0	-36.21	32 22 28.0	17 14 37.15	+12.441	-21 36 48.3	-35.45	



Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Jan. 1	19 16 9.48	+13.611	23 15 30.0	+19.86	1 0 32.3	19 16 16.80	+13.624	23 15 19.4	+19.92
2	19 21 35.80	13.581	23 7 11.9	21.64	2 0 33.8	19 21 43.45	13.594	23 6 59.7	21.71
3	19 27 1.36	13.548	22 58 11.3	23.40	3 0 35.3	19 27 9.33	13.561	22 57 57.5	23.47
4	19 32 26.13	13.514	22 48 28.6	25.15	4 0 36.8	19 32 34.41	13.526	22 48 13.1	25.22
5	19 37 50.04	13.478	22 38 4.2	26.88	5 0 38.2	19 37 58.62	13.490	22 37 47.0	26.95
6	19 43 13.06	13.440	22 26 58.5	28.59	6 0 39.7	19 43 21.94	13.452	22 26 39.5	28.67
7	19 48 35.14	13.400	22 15 12.0	30.28	7 0 41.1	19 48 44.31	13.412	22 14 51.2	30.36
8	19 53 56.24	13.358	22 2 45.2	31.95	8 0 42.5	19 54 5.69	13.370	22 2 22.5	32.03
9	19 59 16.32	13.315	21 49 38.4	33.59	9 0 43.9	19 59 26.05	13.327	21 49 13.8	33.67
10	20 4 35.36	13.271	21 35 52.5	35.22	10 0 45.3	20 4 45.37	13.282	21 35 25.9	35.30
11	20 9 53.31	13.225	21 21 27.8	36.83	11 0 46.6	20 10 3.59	13.236	21 20 59.2	36.92
12	20 15 10.14	13.178	21 6 24.9	38.41	12 0 47.9	20 15 20.68	13.189	21 5 54.2	38.50
13	20 20 25.84	13.130	20 50 44.4	39.96	13 0 49.2	20 20 36.62	13.140	20 50 11.5	40.05
14	20 25 40.37	13.081	20 34 27.0	41.48	14 0 50.5	20 25 51.39	13.091	20 33 52.0	41.57
15	20 30 53.71	13.031	20 17 33.4	42.98	15 0 51.8	20 31 4.97	13.041	20 16 56.2	43.07
16	20 36 5.83	12.980	20 0 4.1	44.46	16 0 53.1	20 36 17.32	12.989	19 59 24.7	44.55
17	20 41 16.73	12.928	19 41 59.7	45.91	17 0 54.3	20 41 28.44	12.937	19 41 18.1	46.00
18	20 46 26.38	12.876	19 23 21.0	47.32	18 0 55.6	20 46 38.30	12.885	19 22 37.2	47.42
19	20 51 34.77	12.823	19 4 8.7	48.70	19 0 56.8	20 51 46.90	12.831	19 3 22.6	48.80
20	20 56 41.89	12.770	18 44 23.6	50.06	20 0 58.0	20 56 54.22	12.778	18 43 35.3	50.16
21	21 1 47.73	12.716	18 24 6.3	51.39	21 0 59.1	21 2 0.25	12.724	18 23 15.7	51.49
22	21 6 52.28	12.662	18 3 17.5	52.68	22 1 0.2	21 7 4.99	12.670	18 2 24.7	52.78
23	21 11 55.53	12.608	17 41 58.1	53.94	23 1 1.3	21 12 8.42	12.615	17 41 3.0	54.04
24	21 16 57.48	12.554	17 20 8.8	55.17	24 1 2.4	21 17 10.54	12.561	17 19 11.5	55.27
25	21 21 58.14	12.500	16 57 50.5	56.37	25 1 3.4	21 22 11.37	12.507	16 56 50.9	56.47
26	21 26 57.52	12.447	16 35 3.9	57.53	26 1 4.5	21 27 10.91	12.453	16 34 2.1	57.63
27	21 31 55.60	12.393	16 11 49.6	58.66	27 1 5.5	21 32 9.14	12.399	16 10 45.5	58.75
28	21 36 52.41	12.340	15 48 8.5	59.76	28 1 6.5	21 37 6.10	12.346	15 47 2.2	59.85
29	21 41 47.94	12.287	15 24 1.5	60.82	29 1 7.5	21 42 1.77	12.293	15 22 53.0	60.91
30	21 46 42.22	12.235	14 59 29.4	61.85	30 1 8.5	21 46 56.19	12.241	14 58 18.7	61.94
31	21 51 35.26	12.184	14 34 32.9	62.85	31 1 9.4	21 51 49.36	12.189	14 33 20.1	62.94
Feb. 1	21 56 27.08	12.133	14 9 12.7	63.82	1 1 10.3	21 56 41.31	12.138	14 7 57.8	63.90
2	22 1 17.69	12.084	13 43 20.7	64.76	2 1 11.2	22 1 32.04	12.089	13 42 12.7	64.84
3	22 6 7.12	12.035	13 17 24.6	65.66	3 1 12.1	22 6 21.59	12.040	13 16 5.6	65.74
4	22 10 55.39	11.988	12 50 58.2	66.53	4 1 13.0	22 11 9.98	11.993	12 49 37.2	66.61
5	22 15 42.54	11.941	12 24 11.4	67.37	5 1 13.9	22 15 57.24	11.945	12 22 48.4	67.45
6	22 20 28.58	11.895	11 57 4.8	68.18	6 1 14.7	22 20 43.39	11.899	11 55 39.9	68.26
7	22 25 13.54	11.851	11 29 39.2	68.95	7 1 15.5	22 25 28.45	11.855	11 28 12.4	69.02
8	22 29 57.45	11.808	11 1 55.5	69.69	8 1 16.3	22 30 12.46	11.812	11 0 26.9	69.75
9	22 34 40.36	11.767	10 33 54.4	70.40	9 1 17.1	22 34 55.47	11.771	10 32 24.0	70.47
10	22 39 22.28	11.727	10 5 36.6	71.08	10 1 17.8	22 39 37.48	11.731	10 4 4.5	71.15
11	22 44 3.25	11.688	9 37 2.8	71.73	11 1 18.6	22 44 18.55	11.692	9 35 20.0	71.80
12	22 48 43.32	11.651	9 8 13.9	72.34	12 1 19.3	22 48 58.71	11.655	9 6 38.4	72.41
13	22 53 22.53	11.615	8 39 10.7	72.92	13 1 20.0	22 53 38.01	11.619	8 37 33.6	72.99
14	22 58 0.89	11.581	8 9 53.9	73.47	14 1 20.7	22 58 16.46	11.585	8 8 15.2	73.54
15	23 2 38.44	11.548	7 40 24.2	73.99	15 1 21.4	23 2 54.10	11.552	7 38 43.9	74.05
16	23 7 15.23	11.517	7 10 42.5	74.48	16 1 22.0	23 7 30.97	11.521	7 9 0.7	74.54
17	23 11 51.30	11.488	6 40 49.6	74.93	17 1 22.7	23 12 7.13	11.492	6 39 6.3	74.99
18	23 16 26.68	11.460	6 10 46.1	75.35	18 1 23.3	23 16 42.59	11.464	6 9 1.4	75.40
19	23 21 1.41	11.434	5 40 32.8	75.74	19 1 24.0	23 21 17.41	11.438	5 38 46.8	75.79
20	23 25 35.52	11.409	5 10 10.6	76.09	20 1 24.6	23 25 51.60	11.413	5 8 23.3	76.14
21	23 30 9.05	11.386	4 39 40.2	76.42	21 1 25.2	23 30 25.22	11.390	4 37 51.7	76.47
22	23 34 42.05	11.365	4 9 2.4	76.72	22 1 25.8	23 34 58.30	11.369	4 7 12.7	76.77
23	23 39 14.55	11.345	3 38 17.9	76.98	23 1 26.4	23 39 30.89	11.349	3 36 27.1	77.03
24	23 43 46.60	11.327	3 7 27.6	77.21	24 1 27.0	23 44 3.02	11.331	3 5 35.7	77.25
25	23 48 18.23	11.310	2 36 32.1	77.41	25 1 27.6	23 48 34.74	11.314	2 34 39.2	77.45
26	23 52 49.48	11.295	2 5 32.3	77.58	26 1 28.2	23 53 6.08	11.299	2 3 38.4	77.62
27	23 57 20.38	11.281	1 34 28.8	77.71	27 1 28.8	23 57 37.07	11.285	1 32 33.9	77.75
28	0 1 50.98	11.270	1 3 22.5	77.81	28 1 29.3	0 2 7.76	11.274	1 1 26.7	77.85
29	0 6 21.34	+11.260	0 32 14.0	+77.88	29 1 29.9	0 6 38.21	+11.264	0 30 17.3	+77.91

Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	<sup>h</sup> 0 <sup>m</sup> 6 <sup>s</sup> 21.34 +11.260	- 0 32' 14.0	+77.88		<sup>d</sup> 1 <sup>h</sup> 1 <sup>m</sup> 29.9	<sup>h</sup> 0 <sup>m</sup> 6 <sup>s</sup> 38.21 +11.264	- 0 30' 17.3	+77.91	
2	0 10 51.48 11.252	- 0 1 4.2	77.93		2 1 30.4	0 11 8.44 11.256	+ 0 0 53.3	77.96	
3	0 15 21.44 11.245	+0 30 6.2	77.94		3 1 31.0	0 15 38.49 11.249	0 32 4.4	77.97	
4	0 19 51.27 11.241	1 1 16.6	77.92		4 1 31.5	0 20 8.42 11.245	1 3 15.5	77.95	
5	0 24 21.02 11.238	1 32 26.1	77.87		5 1 32.1	0 24 38.27 11.242	1 34 25.6	77.90	
6	0 28 50.72 11.237	2 3 34.1	77.79		6 1 32.7	0 29 8.07 11.241	2 5 34.2	77.81	
7	0 33 20.42 11.238	2 34 39.8	77.68		7 1 33.2	0 33 37.87 11.242	2 36 40.5	77.70	
8	0 37 50.15 11.241	3 5 42.5	77.54		8 1 33.8	0 38 7.72 11.246	3 7 43.7	77.56	
9	0 42 19.98 11.246	3 36 41.6	77.37		9 1 34.4	0 42 37.66 11.251	3 38 43.2	77.39	
10	0 46 49.95 11.253	4 7 36.2	77.17		10 1 34.9	0 47 7.74 11.258	4 9 38.2	77.19	
11	0 51 20.10 11.261	4 38 25.6	76.94		11 1 35.5	0 51 38.01 11.266	4 40 28.0	76.95	
12	0 55 50.46 11.271	5 9 9.2	76.68		12 1 36.0	0 56 8.49 11.276	5 11 11.9	76.69	
13	1 0 21.07 11.282	5 39 46.2	76.39		13 1 36.6	1 0 39.23 11.287	5 41 49.1	76.40	
14	1 4 51.98 11.295	6 10 16.0	76.07		14 1 37.2	1 5 10.27 11.300	6 12 19.1	76.08	
15	1 9 23.24 11.310	6 40 37.7	75.72		15 1 37.8	1 9 41.66 11.316	6 42 41.0	75.72	
16	1 13 54.88 11.327	7 10 50.6	75.34		16 1 38.3	1 14 13.44 11.333	7 12 54.0	75.34	
17	1 18 26.94 11.345	7 40 54.0	74.93		17 1 38.9	1 18 45.64 11.351	7 42 57.5	74.93	
18	1 22 59.46 11.365	8 10 47.2	74.49		18 1 39.5	1 23 18.30 11.371	8 12 50.7	74.49	
19	1 27 32.47 11.387	8 40 29.4	74.02		19 1 40.1	1 27 51.46 11.393	8 42 32.9	74.02	
20	1 32 6.03 11.410	9 9 59.8	73.52		20 1 40.7	1 32 25.17 11.417	9 12 3.2	73.52	
21	1 36 40.17 11.435	9 39 17.7	72.98		21 1 41.3	1 36 59.47 11.442	9 41 21.0	72.97	
22	1 41 14.90 11.461	10 8 22.4	72.41		22 1 42.0	1 41 34.37 11.468	10 10 25.5	72.40	
23	1 45 50.26 11.487	10 37 13.1	71.81		23 1 42.7	1 46 9.90 11.494	10 39 15.9	71.80	
24	1 50 26.28 11.515	11 5 48.9	71.18		24 1 43.3	1 50 46.10 11.523	11 7 51.4	71.16	
25	1 55 2.99 11.545	11 34 9.3	70.52		25 1 44.0	1 55 22.99 11.553	11 36 11.4	70.50	
26	1 59 40.43 11.576	12 2 13.5	69.83		26 1 44.6	2 0 0.62 11.584	12 4 15.2	69.81	
27	2 4 18.62 11.607	12 30 0.6	69.10		27 1 45.3	2 4 39.00 11.615	12 32 1.8	69.08	
28	2 8 57.58 11.640	12 57 29.9	68.34		28 1 46.0	2 9 18.15 11.648	12 59 30.6	68.32	
29	2 13 37.34 11.674	13 24 40.7	67.55		29 1 46.7	2 13 58.11 11.682	13 26 40.8	67.52	
30	2 18 17.92 11.709	13 51 32.2	66.73		30 1 47.5	2 18 38.89 11.718	13 53 31.6	66.70	
31	2 22 59.35 11.744	14 18 3.7	65.98		31 1 48.2	2 23 20.53 11.753	14 20 2.4	65.85	
Apr. 1	2 27 41.64 11.781	14 44 14.4	65.00		1 1 49.0	2 28 3.03 11.790	14 46 12.3	64.97	
2	2 32 24.81 11.818	15 10 3.6	64.09		2 1 49.8	2 32 46.42 11.827	15 12 0.7	64.05	
3	2 37 8.90 11.856	15 35 30.6	63.15		3 1 50.6	2 37 30.74 11.866	15 37 26.8	63.11	
4	2 41 53.91 11.895	16 0 34.7	62.18		4 1 51.4	2 42 15.98 11.905	16 2 30.0	62.14	
5	2 46 39.86 11.935	16 25 15.2	61.18		5 1 52.2	2 47 2.17 11.945	16 27 9.5	61.13	
6	2 51 26.77 11.975	16 49 31.2	60.15		6 1 53.0	2 51 49.32 11.985	16 51 24.4	60.10	
7	2 56 14.65 12.016	17 13 22.2	59.09		7 1 53.9	2 56 37.45 12.026	17 15 14.3	59.04	
8	3 1 3.50 12.057	17 36 47.3	58.00		8 1 54.8	3 1 26.55 12.068	17 38 38.2	57.95	
9	3 5 53.35 12.098	17 59 46.0	56.88		9 1 55.7	3 6 16.66 12.109	18 1 35.6	56.82	
10	3 10 44.19 12.140	18 22 17.5	55.73		10 1 56.6	3 11 7.76 12.151	18 24 5.7	55.67	
11	3 15 36.05 12.182	18 44 21.1	54.55		11 1 57.5	3 15 59.89 12.194	18 46 7.9	54.48	
12	3 20 28.92 12.224	19 5 56.1	53.35		12 1 58.4	3 20 53.04 12.236	19 7 41.3	53.28	
13	3 25 22.80 12.266	19 27 1.8	52.11		13 1 59.4	3 25 47.20 12.278	19 28 45.4	52.04	
14	3 30 17.69 12.308	19 47 37.5	50.85		14 2 0.4	3 30 42.38 12.320	19 49 19.4	50.78	
15	3 35 13.59 12.350	20 7 42.6	49.56		15 2 1.4	3 35 38.57 12.362	20 9 22.7	49.48	
16	3 40 10.48 12.391	20 27 16.4	48.24		16 2 2.4	3 40 35.76 12.403	20 28 54.6	48.16	
17	3 45 8.36 12.432	20 46 18.2	46.89		17 2 3.4	3 45 33.94 12.444	20 47 54.5	46.81	
18	3 50 7.21 12.472	21 4 47.3	45.52		18 2 4.4	3 50 33.09 12.484	21 6 21.6	45.43	
19	3 55 7.02 12.511	21 22 43.4	44.12		19 2 5.5	3 55 33.20 12.524	21 24 15.3	44.03	
20	4 0 7.76 12.550	21 40 5.3	42.70		20 2 6.5	4 0 34.24 12.563	21 41 35.3	42.61	
21	4 5 9.42 12.588	21 56 53.0	41.25		21 2 7.6	4 5 36.21 12.601	21 58 20.7	41.15	
22	4 10 11.97 12.624	22 13 5.5	39.78		22 2 8.7	4 10 39.07 12.637	22 14 30.8	39.68	
23	4 15 15.38 12.659	22 28 42.3	38.28		23 2 9.9	4 15 42.79 12.672	22 30 5.1	38.17	
24	4 20 19.61 12.693	22 43 42.8	36.76		24 2 11.0	4 20 47.33 12.706	22 45 3.0	36.65	
25	4 25 24.62 12.725	22 58 6.6	35.22		25 2 12.2	4 25 52.65 12.738	22 59 24.1	35.10	
26	4 30 30.36 12.755	23 11 53.2	33.66		26 2 13.3	4 30 58.72 12.768	23 13 7.9	33.54	
27	4 35 36.84 12.783	23 25 2.0	32.07		27 2 14.5	4 36 5.40 12.796	23 26 13.7	31.94	
28	4 40 43.97 12.810	23 37 32.6	30.47		28 2 15.7	4 41 12.93 12.823	23 38 41.3	30.34	
29	4 45 51.71 12.835	23 49 24.5	28.85		29 2 16.9	4 46 20.98 12.848	23 50 30.1	28.72	
30	4 51 0.02 12.858	24 0 37.4	27.22		30 2 18.1	4 51 29.60 12.871	24 1 39.8	27.08	
31	4 56 8.85 +12.879	+24 11 10.8	+25.57		31 2 19.3	4 56 38.73 +12.892	+24 12 9.9	+25.43	



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July 1	9 48 30.69	+9.917	+14 47 28.4	-60.45	1 3 11.0	9 49 2.24	+9.905	+14 44 15.9	-60.53
2	9 52 27.63	9.828	14 23 10.0	61.09	2 3 11.0	9 52 58.90	9.816	14 19 55.5	61.17
3	9 56 22.43	9.739	13 58 36.5	61.70	3 3 10.9	9 56 53.41	9.727	13 55 20.1	61.77
4	10 0 15.09	9.650	13 33 48.8	62.27	4 3 10.9	10 0 45.77	9.637	13 31 30.6	62.34
5	10 4 5.60	9.560	13 8 47.6	62.82	5 3 10.8	10 4 35.98	9.547	13 5 27.8	62.88
6	10 7 53.96	9.470	12 43 33.5	63.34	6 3 10.6	10 8 24.03	9.457	12 40 12.2	63.40
7	10 11 40.14	9.379	12 18 7.3	63.83	7 3 10.4	10 12 9.89	9.366	12 14 44.6	63.88
8	10 15 24.16	9.289	11 52 29.8	64.29	8 3 10.2	10 15 53.59	9.275	11 49 5.9	64.34
9	10 19 6.00	9.198	11 26 41.7	64.72	9 3 10.0	10 19 35.10	9.184	11 23 16.7	64.76
10	10 22 45.65	9.107	11 0 43.7	65.12	10 3 9.7	10 23 14.42	9.093	10 57 17.8	65.16
11	10 26 23.11	9.015	10 34 36.5	65.49	11 3 9.4	10 26 51.54	9.001	10 31 9.8	65.52
12	10 29 58.36	8.923	10 8 20.7	65.82	12 3 9.1	10 30 26.45	8.908	10 4 53.3	65.84
13	10 33 31.36	8.830	9 41 57.1	66.13	13 3 8.7	10 33 59.10	8.815	9 38 29.2	66.15
14	10 37 2.12	8.736	9 15 26.6	66.40	14 3 8.3	10 37 29.51	8.721	9 11 58.3	66.41
15	10 40 30.65	8.641	8 48 49.9	66.65	15 3 7.8	10 40 57.68	8.626	8 45 21.4	66.65
16	10 43 56.89	8.545	8 22 7.7	66.87	16 3 7.3	10 44 23.55	8.529	8 18 39.1	66.87
17	10 47 20.82	8.448	7 55 20.7	67.05	17 3 6.7	10 47 47.10	8.432	7 51 52.1	67.04
18	10 50 42.41	8.350	7 28 29.7	67.20	18 3 6.1	10 51 8.30	8.334	7 25 1.3	67.18
19	10 54 1.63	8.251	7 1 35.5	67.31	19 3 5.5	10 54 27.13	8.234	6 58 7.5	67.29
20	10 57 18.46	8.151	6 34 39.1	67.39	20 3 4.8	10 57 43.56	8.134	6 31 11.6	67.36
21	11 0 32.84	8.049	6 7 41.2	67.44	21 3 4.1	11 0 57.53	8.032	6 4 14.3	67.41
22	11 3 44.74	7.944	5 40 42.5	67.45	22 3 3.3	11 4 9.01	7.926	5 37 16.4	67.41
23	11 6 54.10	7.837	5 13 43.9	67.43	23 3 2.5	11 7 17.94	7.819	5 10 18.7	67.38
24	11 10 0.87	7.728	4 46 46.3	67.37	24 3 1.7	11 10 24.26	7.710	4 43 22.2	67.32
25	11 13 5.00	7.616	4 19 50.4	67.28	25 3 0.8	11 13 27.94	7.597	4 16 27.6	67.22
26	11 16 6.43	7.502	3 52 57.2	67.15	26 2 59.9	11 16 28.91	7.483	3 49 35.8	67.08
27	11 19 5.10	7.386	3 26 7.6	66.98	27 2 58.9	11 19 27.11	7.366	3 22 47.8	66.91
28	11 22 0.95	7.267	2 59 22.4	66.78	28 2 57.9	11 22 22.48	7.247	2 56 4.3	66.70
29	11 24 53.91	7.145	2 32 42.5	66.54	29 2 56.8	11 25 14.95	7.124	2 29 26.3	66.46
30	11 27 43.90	7.020	2 6 8.8	66.27	30 2 55.7	11 28 4.44	6.999	2 2 54.6	66.18
31	11 30 30.85	6.892	1 39 42.2	65.95	31 2 54.5	11 30 50.88	6.870	1 36 30.2	65.85
Aug. 1	11 33 14.67	6.760	1 13 23.7	65.59	1 2 53.3	11 33 34.18	6.738	1 10 14.1	65.49
2	11 35 55.28	6.624	0 47 14.1	65.20	2 2 52.1	11 36 14.26	6.610	0 44 7.0	65.09
3	11 38 32.60	6.485	0 21 14.4	64.77	3 2 50.8	11 38 51.04	6.462	0 18 10.0	64.65
4	11 41 6.54	6.342	0 4 34.6	64.30	4 2 49.4	11 41 24.43	6.319	0 7 36.2	64.18
5	11 43 37.00	6.195	0 30 11.8	63.79	5 2 48.0	11 43 54.33	6.171	0 33 10.4	63.66
6	11 46 3.89	6.044	0 55 36.3	63.24	6 2 46.5	11 46 20.65	6.020	0 58 31.7	63.10
7	11 48 27.09	5.889	1 20 47.1	62.65	7 2 44.9	11 48 43.27	5.864	1 23 39.2	62.51
8	11 50 46.50	5.729	1 45 43.1	62.01	8 2 43.3	11 51 2.08	5.704	1 48 31.8	61.86
9	11 53 2.00	5.563	2 10 23.1	61.32	9 2 41.6	11 53 16.97	5.537	2 13 8.2	61.16
10	11 55 13.46	5.392	2 34 46.1	60.59	10 2 39.8	11 55 27.81	5.366	2 37 27.4	60.43
11	11 57 20.75	5.216	2 58 50.9	59.80	11 2 38.0	11 57 34.47	5.189	3 1 28.3	59.63
12	11 59 23.74	5.033	3 22 36.2	58.96	12 2 36.1	11 59 36.82	5.006	3 25 9.5	58.79
13	12 1 22.26	4.844	3 46 0.8	58.07	13 2 34.1	12 1 34.68	4.816	3 48 29.9	57.89
14	12 3 16.17	4.648	4 9 3.2	57.12	14 2 32.0	12 3 27.93	4.620	4 11 27.9	56.93
15	12 5 5.30	4.445	4 31 42.2	56.11	15 2 29.9	12 5 16.39	4.417	4 34 2.3	55.91
16	12 6 49.48	4.235	4 53 56.2	55.04	16 2 27.7	12 6 59.89	4.206	4 56 11.6	54.84
17	12 8 28.52	4.017	5 15 43.6	53.90	17 2 25.4	12 8 38.24	3.988	5 17 54.1	53.69
18	12 10 2.24	3.791	5 37 2.8	52.68	18 2 23.0	12 10 11.26	3.762	5 39 8.3	52.46
19	12 11 30.44	3.557	5 57 51.9	51.40	19 2 20.5	12 11 38.75	3.527	5 59 52.2	51.18
20	12 12 52.92	3.314	6 18 9.3	50.03	20 2 17.9	12 13 0.52	3.284	6 20 4.3	49.80
21	12 14 9.47	3.063	6 37 52.9	48.58	21 2 15.2	12 14 16.35	3.033	6 39 42.4	48.34
22	12 15 19.88	2.803	6 57 0.7	47.05	22 2 12.4	12 15 26.03	2.773	6 58 44.5	46.81
23	12 16 23.92	2.533	7 15 30.6	45.43	23 2 9.6	12 16 29.37	2.503	7 17 8.6	45.18
24	12 17 21.40	2.255	7 33 20.5	43.72	24 2 6.6	12 17 26.14	2.226	7 34 52.6	43.47
25	12 18 12.09	1.967	7 50 28.1	41.91	25 2 3.5	12 18 16.12	1.938	7 51 54.3	41.66
26	12 18 55.77	1.671	8 6 51.1	40.00	26 2 0.3	12 18 59.10	1.643	8 8 11.2	39.74
27	12 19 32.25	1.367	8 22 27.1	37.99	27 1 57.0	12 19 34.90	1.340	8 23 41.0	37.73
28	12 20 1.32	1.054	8 37 13.7	35.87	28 1 53.6	12 20 3.31	1.028	8 38 21.4	35.61
29	12 20 22.79	0.734	8 51 8.2	33.65	29 1 50.0	12 20 24.13	0.709	8 52 9.7	33.39
30	12 20 36.50	0.407	9 4 8.0	31.32	30 1 46.3	12 20 37.21	0.283	9 5 3.3	31.06
31	12 20 42.20	+0.072	9 16 10.4	-28.87	31 1 42.4	12 20 42.41	+0.050	9 16 59.5	-28.62

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept.	1	12 20 40.02	-0.265	9 27 12.7	-26.31	1 1 38.4	12 20 39.58	-0.287	9 27 55.7	-26.06
	2	12 20 29.57	0.607	9 37 12.3	23.63	2 1 34.3	12 20 28.62	0.627	9 37 49.4	23.38
	3	12 20 10.87	0.952	9 46 6.5	20.85	3 1 30.1	12 20 9.44	0.970	9 46 37.7	20.61
	4	12 19 43.87	1.298	9 53 52.6	17.95	4 1 25.7	12 19 42.01	1.313	9 54 18.1	17.72
	5	12 19 8.58	1.644	10 0 27.6	14.95	5 1 21.2	12 19 6.35	1.657	10 0 47.7	14.74
	6	12 18 24.98	1.988	10 5 48.8	11.84	6 1 16.5	12 18 22.43	1.998	10 6 3.8	11.64
	7	12 17 33.14	2.329	10 9 54.3	8.62	7 1 11.7	12 17 30.34	2.336	10 10 4.5	8.44
	8	12 16 33.22	2.664	10 12 41.8	5.31	8 1 6.8	12 16 30.25	2.668	10 12 47.6	5.15
	9	12 15 25.34	2.992	10 14 8.9	-1.92	9 1 1.8	12 15 22.27	2.994	10 14 10.7	-1.78
	10	12 14 9.69	3.309	10 14 13.8	+1.54	10 0 56.6	12 14 6.59	3.308	10 14 12.2	+1.66
	11	12 12 46.60	3.613	10 12 55.0	5.05	11 0 51.3	12 12 43.51	3.609	10 12 50.6	5.14
	12	12 11 16.37	3.902	10 10 11.1	8.60	12 0 45.8	12 11 13.39	3.895	10 10 4.5	8.67
	13	12 9 39.42	4.174	10 6 1.5	12.19	13 0 50.2	12 9 36.62	4.164	10 5 53.3	12.23
	14	12 7 56.17	4.426	10 0 25.8	15.78	14 0 34.6	12 7 53.62	4.413	10 0 16.7	15.78
	15	12 6 7.15	4.656	9 53 24.5	19.34	15 0 28.9	12 6 4.92	4.641	9 53 15.3	19.32
	16	12 4 12.91	4.860	9 44 58.0	22.86	16 0 23.0	12 4 11.05	4.842	9 44 49.3	22.81
	17	12 2 14.08	5.037	9 35 8.0	26.30	17 0 17.1	12 2 12.65	5.017	9 35 0.6	26.22
	18	12 0 11.36	5.184	9 23 56.4	29.64	18 0 11.1	12 0 10.40	5.163	9 23 50.9	29.53
	19	11 58 5.49	5.300	9 11 25.7	32.86	19 0 5.0	11 58 5.04	5.278	9 11 22.9	32.72
	20	11 55 57.24	5.382	8 57 40.3	35.93	19 23 58.9	11 55 57.32	5.359	8 57 40.8	35.76
	21	11 53 47.42	5.430	8 42 43.3	38.80	20 23 52.8	11 53 48.05	5.407	8 42 47.8	38.61
	22	11 51 36.86	5.443	8 26 39.8	41.46	21 23 46.8	11 51 38.05	5.421	8 26 48.8	41.25
	23	11 49 26.42	5.420	8 9 35.1	43.88	22 23 40.8	11 49 28.15	5.398	8 9 49.1	43.65
	24	11 47 16.99	5.360	7 51 35.4	46.04	23 23 34.8	11 47 19.24	5.340	7 51 54.8	45.81
	25	11 45 9.43	5.264	7 32 47.5	47.91	24 23 28.8	11 45 12.17	5.245	7 33 12.5	47.67
	26	11 43 4.60	5.134	7 13 18.2	49.47	25 23 22.8	11 43 7.79	5.118	7 13 49.0	49.23
	27	11 41 3.31	4.969	6 53 14.8	50.74	26 23 16.8	11 41 6.89	4.955	6 53 51.4	50.50
	28	11 39 6.36	4.772	6 32 44.9	51.70	27 23 10.9	11 39 10.27	4.761	6 33 27.2	51.47
	29	11 37 14.51	4.545	6 11 55.9	52.33	28 23 5.1	11 37 18.69	4.538	6 12 43.7	52.11
	30	11 35 28.43	4.291	5 50 55.5	52.64	29 22 59.4	11 35 32.78	4.287	5 51 48.6	52.43
Oct.	1	11 33 48.79	4.011	5 29 51.2	52.65	30 22 53.8	11 33 53.23	4.011	5 30 49.3	52.46
	2	11 32 16.15	3.707	5 8 50.7	52.36	1 23 48.4	11 32 20.59	3.711	5 9 53.3	52.20
	3	11 30 51.05	3.384	4 48 0.4	51.78	2 22 43.1	11 30 55.41	3.391	4 49 6.9	51.64
	4	11 29 33.89	3.044	4 27 27.5	50.93	3 22 37.9	11 29 38.08	3.055	4 28 37.3	50.82
	5	11 28 25.06	2.690	4 7 17.6	49.84	4 22 32.8	11 28 28.99	2.704	4 8 30.1	49.75
	6	11 27 24.88	2.325	3 47 37.0	48.52	5 22 27.8	11 27 28.47	2.342	3 48 51.6	48.46
	7	11 26 33.55	1.952	3 28 30.3	47.00	6 22 23.0	11 26 36.72	1.972	3 29 46.3	46.96
	8	11 25 51.24	1.574	3 10 2.5	45.30	7 22 18.3	11 25 53.93	1.597	3 11 19.4	45.29
	9	11 25 18.05	1.192	2 52 17.5	43.44	8 22 13.8	11 25 20.18	1.218	2 53 34.5	43.46
	10	11 24 54.03	0.809	2 35 18.7	41.44	9 22 9.4	11 24 55.54	0.837	2 36 35.1	41.49
	11	11 24 39.19	0.427	2 19 9.6	39.31	10 22 5.2	11 24 40.03	0.457	2 20 24.8	39.38
	12	11 24 33.50	-0.048	2 3 52.7	37.08	11 22 1.2	11 24 33.62	-0.080	2 5 6.2	37.18
	13	11 24 36.87	+0.327	1 49 30.2	34.78	12 21 57.3	11 24 36.23	+0.294	1 50 41.4	34.90
	14	11 24 49.16	0.696	1 36 3.7	32.41	13 21 53.6	11 24 47.72	0.662	1 37 12.1	32.55
	15	11 25 10.24	1.059	1 23 34.5	30.00	14 21 50.0	11 25 7.97	1.024	1 24 39.6	30.15
	16	11 25 39.94	1.414	1 12 3.8	27.55	15 21 46.6	11 25 36.82	1.378	1 13 5.2	27.72
	17	11 26 18.07	1.762	1 1 32.2	25.08	16 21 43.3	11 26 14.08	1.726	1 2 29.5	25.26
	18	11 27 4.43	2.100	0 52 0.2	22.60	17 21 40.1	11 26 59.56	2.063	0 52 53.1	22.80
	19	11 27 58.82	2.430	0 43 27.8	20.11	18 21 37.0	11 27 53.06	2.393	0 44 16.0	20.32
	20	11 29 1.00	2.750	0 35 55.0	17.62	19 21 34.1	11 28 54.34	2.713	0 36 38.2	17.84
	21	11 30 10.75	3.061	0 29 21.7	15.15	20 21 31.3	11 30 3.20	3.024	0 29 59.6	15.38
	22	11 31 27.84	3.262	0 23 47.6	12.70	21 21 28.6	11 31 19.39	3.325	0 24 19.9	12.94
	23	11 32 52.04	3.653	0 19 12.1	10.27	22 21 26.0	11 32 42.69	3.617	0 19 38.7	10.51
	24	11 34 23.12	3.935	0 15 34.5	7.87	23 21 23.6	11 34 12.89	3.899	0 15 55.3	8.12
	25	11 36 0.84	4.207	0 12 54.1	5.50	24 21 21.3	11 35 49.75	4.171	0 13 8.9	5.75
	26	11 37 44.99	4.470	0 11 10.0	3.18	25 21 19.1	11 37 33.04	4.435	0 11 18.8	3.43
	27	11 39 35.32	4.723	0 10 21.3	+0.89	26 21 17.0	11 39 22.53	4.688	0 10 24.0	+1.15
	28	11 41 31.62	4.967	0 10 27.1	-1.36	27 21 15.0	11 41 18.00	4.933	0 10 23.6	-1.10
	29	11 43 33.66	5.202	0 11 26.3	3.56	28 21 13.1	11 43 19.23	5.169	0 11 16.6	3.30
	30	11 45 41.24	5.428	0 13 17.7	5.72	29 21 11.3	11 45 26.01	5.396	0 13 1.9	5.47
31	11 47 54.15	+5.646	0 16 0.1	-7.82	30 21 9.6	11 47 38.14	5.614	0 15 38.1	7.57	
					31 21 7.9	11 49 55.40	+5.824	0 19 4.3	-9.62	

Date. 1879.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Nov. 1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"	
	11 50 12.18	+ 5.855	0 19 32.4	- 9.87	1 21 6.3	11 52 17.61	+ 6.026	0 23 19.2	- 11.61	
	2 11 52 35.13	6.056	0 23 53.3	11.86	2 21 4.8	11 54 44.58	6.220	0 28 21.3	13.56	
	3 11 55 2.81	6.249	0 29 1.4	13.80	3 21 3.4	11 57 16.11	6.407	0 34 9.4	15.45	
	4 11 57 35.03	6.435	0 34 55.4	15.69	4 21 2.0	11 59 52.02	6.586	0 40 42.4	17.28	
	5 12 0 11.61	6.613	0 41 34.2	17.52	5 21 0.7	12 2 32.14	6.758	0 47 58.8	19.07	
	6 12 2 52.37	6.784	0 48 56.3	19.30	6 20 59.6	12 5 16.28	6.922	0 55 57.0	20.78	
	7 12 5 37.14	6.947	0 57 0.0	21.01	7 20 58.5	12 8 4.29	7.080	1 4 36.0	22.45	
	8 12 8 25.76	7.104	1 5 44.4	22.67	8 20 57.5	12 10 56.01	7.231	1 13 54.3	24.07	
	9 12 11 18.06	7.254	1 15 8.0	24.28	9 20 56.5	12 13 51.29	7.376	1 23 50.7	25.62	
	10 12 14 13.90	7.398	1 25 9.5	25.83	10 20 55.5	12 16 49.98	7.514	1 34 23.5	27.12	
	11 12 17 13.13	7.536	1 35 47.3	27.32	11 20 54.6	12 19 51.93	7.647	1 45 31.6	28.55	
	12 12 20 15.60	7.668	1 47 0.3	28.75	12 20 53.7	12 22 57.00	7.775	1 57 13.6	29.94	
	13 12 23 21.18	7.795	1 58 47.0	30.13	13 20 52.9	12 26 5.08	7.898	2 9 28.4	31.28	
	14 12 26 29.75	7.918	2 11 6.3	31.46	14 20 52.1	12 29 16.08	8.017	2 22 14.6	32.57	
	15 12 29 41.22	8.036	2 23 56.9	32.74	15 20 51.4	12 32 29.89	8.133	2 35 31.0	33.80	
	16 12 32 55.48	8.151	2 37 17.5	33.97	16 20 50.7	12 35 46.39	8.244	2 49 16.3	34.98	
	17 12 36 12.42	8.261	2 51 6.9	35.14	17 20 50.1	12 39 5.51	8.350	3 3 29.4	36.11	
	18 12 39 31.96	8.367	3 5 23.9	36.27	18 20 49.5	12 42 27.15	8.453	3 18 9.0	37.20	
	19 12 42 54.01	8.469	3 20 7.3	37.35	19 20 49.0	12 45 51.22	8.553	3 33 14.0	38.23	
	20 12 46 18.47	8.569	3 35 16.0	38.38	20 20 48.5	12 49 17.65	8.650	3 48 43.4	39.22	
	21 12 49 45.28	8.665	3 50 48.9	39.36	21 20 48.0	12 52 46.37	8.744	4 4 36.1	40.17	
	22 12 53 14.37	8.759	4 6 44.9	40.30	22 20 47.6	12 56 17.33	8.837	4 20 51.0	41.06	
	23 12 56 45.69	8.851	4 23 2.9	41.19	23 20 47.2	12 59 50.48	8.926	4 37 26.8	41.92	
	24 13 0 19.18	8.940	4 39 41.7	42.04	24 20 46.9	13 3 25.75	9.013	4 54 22.6	42.73	
	25 13 3 54.79	9.027	4 56 40.3	42.84	25 20 46.6	13 7 3.11	9.099	5 11 37.2	43.49	
	26 13 7 32.47	9.112	5 13 57.6	43.59	26 20 46.3	13 10 42.49	9.183	5 29 9.5	44.19	
	27 13 11 12.17	9.196	5 31 32.4	44.29	27 20 46.0	13 14 23.88	9.266	5 46 58.3	44.87	
	28 13 14 53.86	9.278	5 49 23.6	44.96	28 20 45.8	13 18 7.21	9.346	6 5 2.7	45.50	
	29 13 18 37.49	9.358	6 7 30.2	45.58	29 20 45.6	13 21 52.48	9.425	6 23 21.8	46.08	
	30 13 22 23.03	9.437	6 25 51.3	46.16	30 20 45.4	13 25 39.62	9.503	6 41 54.2	46.62	
Dec. 1	13 26 10.45	9.514	6 44 25.6	46.69	1 20 45.3	13 29 28.62	9.579	7 0 39.2	47.11	
	2 13 29 59.71	9.590	7 3 12.2	47.17	2 20 45.2	13 33 19.43	9.654	7 19 35.3	47.56	
	3 13 33 50.78	9.664	7 22 9.8	47.61	3 20 45.2	13 37 12.03	9.728	7 38 41.7	47.95	
	4 13 37 43.63	9.738	7 41 17.5	48.00	4 20 45.1	13 41 6.39	9.800	7 57 57.1	48.31	
	5 13 41 38.23	9.810	8 0 34.1	48.35	5 20 45.1	13 45 2.48	9.872	8 17 20.5	48.63	
	6 13 45 34.55	9.882	8 19 58.5	48.66	6 20 45.2	13 49 0.29	9.943	8 36 50.9	48.90	
	7 13 49 32.58	9.952	8 39 29.7	48.93	7 20 45.2	13 52 59.78	10.013	8 56 27.2	49.13	
	8 13 53 32.29	10.022	8 59 6.7	49.15	8 20 45.3	13 57 0.93	10.083	9 16 8.5	49.30	
	9 13 57 33.65	10.091	9 18 48.5	49.32	9 20 45.4	14 1 3.74	10.151	9 35 53.5	49.44	
	10 14 1 36.66	10.159	9 38 33.9	49.45	10 20 45.5	14 5 8.16	10.218	9 55 41.4	49.54	
	11 14 5 41.28	10.226	9 58 22.0	49.54	11 20 45.6	14 9 14.19	10.284	10 15 31.2	49.59	
	12 14 9 47.50	10.292	10 18 11.8	49.59	12 20 45.8	14 13 21.80	10.351	10 35 21.6	49.61	
	13 14 13 55.30	10.358	10 38 2.1	49.60	13 20 46.0	14 17 31.00	10.416	10 55 11.9	49.58	
	14 14 18 4.67	10.423	10 57 52.1	49.56	14 20 46.2	14 21 41.76	10.481	11 15 1.0	49.50	
	15 14 22 15.60	10.488	11 17 40.7	49.48	15 20 46.5	14 25 54.07	10.545	11 34 47.8	49.39	
	16 14 26 28.07	10.552	11 37 26.9	49.36	16 20 46.8	14 30 7.91	10.610	11 54 31.5	49.25	
	17 14 30 42.07	10.616	11 57 9.9	49.21	17 20 47.1	14 34 23.29	10.673	12 14 11.2	49.05	
	18 14 34 57.60	10.679	12 16 48.7	49.01	18 20 47.5	14 38 40.21	10.737	12 33 45.8	48.82	
	19 14 39 14.66	10.743	12 36 22.3	48.77	19 20 47.8	14 42 58.65	10.801	12 53 14.4	48.55	
	20 14 43 33.24	10.806	12 55 49.7	48.50	20 20 48.2	14 47 18.62	10.865	13 12 36.1	48.25	
	21 14 47 53.34	10.870	13 15 10.1	48.19	21 20 48.6	14 51 40.11	10.928	13 31 50.0	47.90	
	22 14 52 14.96	10.933	13 34 22.6	47.84	22 20 49.0	14 56 3.13	10.991	13 50 55.1	47.52	
	23 14 56 38.10	10.996	13 53 26.2	47.45	23 20 49.5	15 0 27.67	11.055	14 9 50.7	47.11	
	24 15 1 2.75	11.059	14 12 20.1	47.03	24 20 50.0	15 4 53.73	11.118	14 28 35.8	46.64	
	25 15 5 28.92	11.122	14 31 3.3	46.56	25 20 50.5	15 9 21.31	11.181	14 47 9.4	46.15	
	26 15 9 56.60	11.185	14 49 34.9	46.06	26 20 51.1	15 13 50.40	11.244	15 5 30.5	45.61	
	27 15 14 25.79	11.248	15 7 53.9	45.52	27 20 51.7	15 18 21.01	11.307	15 23 38.3	45.04	
	28 15 18 56.49	11.310	15 25 59.5	44.94	28 20 52.3	15 22 53.13	11.370	15 41 32.0	44.43	
	29 15 23 28.69	11.373	15 43 50.8	44.33	29 20 52.9	15 27 26.75	11.432	15 59 10.6	43.79	
	30 15 28 2.39	11.435	16 1 26.9	43.68	30 20 53.6	15 32 1.88	11.494	16 16 33.2	43.10	
	31 15 32 37.59	11.497	16 18 46.9	42.99	31 20 54.2	15 36 38.50	11.556	16 33 38.9	42.38	
	32 15 37 14.27	+11.559	-16 35 49.9	-42.26	32 20 54.9	15 41 16.59	+11.618	-16 50 26.9	-41.62	

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
1879.		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>″</sup>	<sup>″</sup>	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>″</sup>	<sup>″</sup>
Jan.	0	16 12 35.96	+7.302	+21 3 24.9	-20.33	0 21 31.7	16 15 13.33	+7.313	-21 10 36.3	-19.92
	1	16 15 31.41	7.319	21 11 27.5	19.88	1 21 30.7	16 18 9.06	7.331	21 18 30.9	19.46
	2	16 18 27.32	7.338	21 19 19.3	19.43	2 21 29.7	16 21 5.24	7.349	21 26 12.7	19.01
	3	16 21 23.66	7.356	21 27 0.2	18.97	3 21 28.7	16 24 1.85	7.368	21 33 43.3	18.54
	4	16 24 20.44	7.375	21 34 30.0	18.50	4 21 27.7	16 26 58.89	7.386	21 41 2.8	18.08
	5	16 27 17.65	7.393	21 41 48.6	18.04	5 21 26.7	16 29 56.36	7.404	21 48 11.0	17.61
	6	16 30 15.29	7.410	21 48 55.9	17.57	6 21 25.6	16 32 54.26	7.421	21 55 7.9	17.13
	7	16 33 13.35	7.428	21 55 51.9	17.09	7 21 24.8	16 35 52.58	7.438	22 1 53.4	16.65
	8	16 36 11.83	7.445	22 2 36.3	16.61	8 21 23.8	16 38 51.31	7.455	22 8 27.2	16.17
	9	16 39 10.73	7.462	22 9 9.2	16.12	9 21 22.9	16 41 50.46	7.473	22 14 49.4	15.68
	10	16 42 10.04	7.480	22 15 30.3	15.63	10 21 21.9	16 44 50.02	7.490	22 20 59.8	15.18
	11	16 45 9.77	7.497	22 21 39.7	15.14	11 21 21.0	16 47 49.98	7.506	22 26 58.3	14.68
	12	16 48 9.89	7.513	22 27 37.2	14.64	12 21 20.0	16 50 50.33	7.523	22 32 44.8	14.19
	13	16 51 10.40	7.529	22 33 22.6	14.14	13 21 19.1	16 53 51.08	7.539	22 38 19.3	13.69
	14	16 54 11.30	7.546	22 38 55.9	13.63	14 21 18.2	16 56 52.21	7.555	22 43 41.6	13.17
	15	16 57 12.59	7.561	22 44 17.0	13.12	15 21 17.3	16 59 53.71	7.569	22 48 51.5	12.65
	16	17 0 14.25	7.576	22 49 25.7	12.61	16 21 16.4	17 2 55.57	7.584	22 53 49.0	12.13
	17	17 3 16.27	7.591	22 54 22.1	12.08	17 21 15.5	17 5 57.78	7.599	22 58 34.0	11.62
	18	17 6 18.64	7.606	22 59 5.9	11.56	18 21 14.6	17 9 0.34	7.613	23 3 6.5	11.10
	19	17 9 21.34	7.620	23 3 37.1	11.04	19 21 13.7	17 12 3.24	7.627	23 7 26.4	10.57
	20	17 12 24.39	7.633	23 7 55.6	10.51	20 21 12.8	17 15 6.45	7.640	23 11 33.5	10.03
	21	17 15 27.75	7.647	23 12 1.4	9.97	21 21 11.9	17 18 9.97	7.653	23 15 27.7	9.49
	22	17 18 31.43	7.659	23 15 54.2	9.43	22 21 11.0	17 21 13.80	7.666	23 19 9.1	8.95
	23	17 21 35.40	7.672	23 19 34.2	8.89	23 21 10.2	17 24 17.92	7.677	23 22 37.4	8.41
	24	17 24 39.67	7.683	23 23 1.2	8.35	24 21 9.3	17 27 22.31	7.688	23 25 52.8	7.87
	25	17 27 44.20	7.694	23 26 15.1	7.81	25 21 8.5	17 30 26.96	7.698	23 28 55.1	7.32
	26	17 30 48.99	7.705	23 29 15.9	7.26	26 21 7.6	17 33 31.87	7.709	23 31 44.2	6.77
	27	17 33 54.05	7.715	23 32 3.5	6.71	27 21 6.7	17 36 37.03	7.719	23 34 20.0	6.21
	28	17 36 59.33	7.725	23 34 37.8	6.15	28 21 5.9	17 39 42.42	7.729	23 36 42.5	5.66
	29	17 40 4.86	7.735	23 36 58.9	5.60	29 21 5.0	17 42 48.04	7.739	23 38 51.8	5.11
	30	17 43 10.62	7.744	23 39 6.6	5.04	30 21 4.2	17 45 53.88	7.748	23 40 47.7	4.55
	31	17 46 16.60	7.753	23 41 0.9	4.49	31 21 3.4	17 48 59.93	7.756	23 42 30.2	3.99
Feb.	1	17 49 22.78	7.761	23 42 41.8	3.92	1 21 2.5	17 52 6.18	7.764	23 43 59.2	3.43
	2	17 52 29.16	7.770	23 44 9.2	3.36	2 21 1.7	17 55 12.62	7.772	23 45 14.6	2.86
	3	17 55 35.73	7.777	23 45 23.0	2.80	3 21 0.9	17 58 19.24	7.779	23 46 16.5	2.29
	4	17 58 42.48	7.784	23 46 23.3	2.23	4 21 0.0	18 1 26.03	7.786	23 47 4.8	1.73
	5	18 1 49.39	7.791	23 47 9.9	1.66	5 20 59.2	18 4 32.98	7.793	23 47 39.5	1.16
	6	18 4 56.47	7.798	23 47 42.9	1.08	6 20 58.4	18 7 40.08	7.799	23 48 0.4	0.59
	7	18 8 3.71	7.804	23 48 2.2	-0.52	7 20 57.6	18 10 47.33	7.805	23 48 7.7	-0.02
	8	18 11 11.09	7.810	23 48 7.7	+0.05	8 20 56.7	18 13 54.73	7.811	23 48 1.2	+0.56
	9	18 14 18.61	7.815	23 47 59.5	+0.62	9 20 55.9	18 17 2.26	7.815	23 47 41.0	1.13
	10	18 17 26.26	7.820	23 47 37.5	1.20	10 20 55.1	18 20 9.90	7.820	23 47 7.0	1.71
	11	18 20 34.02	7.825	23 47 1.7	1.78	11 20 54.3	18 23 17.64	7.824	23 46 19.2	2.28
	12	18 23 41.88	7.829	23 46 12.1	2.36	12 20 53.5	18 26 25.47	7.827	23 45 17.6	2.86
	13	18 26 49.82	7.832	23 45 8.6	2.93	13 20 52.7	18 29 33.37	7.830	23 44 2.1	3.43
	14	18 29 57.83	7.835	23 43 51.4	3.50	14 20 51.9	18 32 41.33	7.832	23 42 32.9	4.00
	15	18 33 5.90	7.837	23 42 20.3	4.08	15 20 51.1	18 35 49.34	7.834	23 40 49.9	4.58
	16	18 36 14.02	7.838	23 40 35.4	4.66	16 20 50.3	18 38 57.34	7.835	23 38 53.1	5.15
	17	18 39 22.17	7.839	23 38 36.7	5.23	17 20 49.5	18 42 5.44	7.835	23 36 42.5	5.72
	18	18 42 30.33	7.840	23 36 24.2	5.80	18 20 48.7	18 45 13.50	7.835	23 34 18.1	6.31
	19	18 45 38.51	7.840	23 33 57.9	6.38	19 20 47.9	18 48 21.56	7.835	23 31 39.9	6.88
	20	18 48 46.67	7.839	23 31 17.8	6.95	20 20 47.1	18 51 29.60	7.834	23 28 48.0	7.44
	21	18 51 54.81	7.838	23 28 24.0	7.53	21 20 46.2	18 54 37.60	7.832	23 25 42.5	8.02
	22	18 55 2.91	7.836	23 25 16.5	8.10	22 20 45.4	18 57 45.56	7.830	23 22 23.3	8.58
	23	18 58 10.97	7.834	23 21 55.4	8.66	23 20 44.6	19 0 53.45	7.827	23 18 50.5	9.15
	24	19 1 18.96	7.831	23 18 20.6	9.23	24 20 43.8	19 4 1.27	7.824	23 15 4.1	9.71
	25	19 4 26.87	7.827	23 14 32.2	9.79	25 20 43.0	19 7 9.01	7.820	23 11 4.2	10.28
	26	19 7 34.70	7.824	23 10 30.4	10.36	26 20 42.2	19 10 16.65	7.816	23 6 50.9	10.83
	27	19 10 42.44	7.820	23 6 15.0	10.92	27 20 41.4	19 13 24.20	7.812	23 2 24.0	11.40
	28	19 13 50.08	7.816	23 1 46.2	11.48	28 20 40.6	19 16 31.64	7.808	22 57 43.7	11.95
	29	19 16 57.61	+7.811	-22 57 3.9	+12.03	29 20 39.7	19 19 38.96	+7.803	-22 52 50.1	+12.51

Date. 1879.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Mar. 1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"	
1	19 16 57.61	+7.811	-22 57 3.9	+12.03	1 20 39.7	19 19 38.96	+7.803	-22 52 50.1	+12.51	
2	19 20 5.02	7.806	-22 52 8.3	12.59	2 20 38.9	19 22 46.14	7.797	-22 47 43.2	13.07	
3	19 23 12.29	7.800	-22 46 59.3	13.14	3 20 38.1	19 25 53.19	7.791	-22 42 23.1	13.61	
4	19 26 19.42	7.794	-22 41 37.2	13.69	4 20 37.3	19 29 0.09	7.785	-22 36 49.8	14.16	
5	19 29 26.42	7.788	-22 36 1.9	14.25	5 20 36.4	19 32 6.85	7.779	-22 31 3.4	14.70	
6	19 32 33.26	7.782	-22 30 13.4	14.79	6 20 35.6	19 35 13.46	7.772	-22 25 3.9	15.25	
7	19 35 39.95	7.775	-22 24 11.8	15.34	7 20 34.8	19 38 19.90	7.765	-22 18 51.3	15.79	
8	19 38 46.47	7.768	-22 17 57.2	15.88	8 20 33.9	19 41 26.17	7.758	-22 12 25.8	16.33	
9	19 41 52.82	7.761	-22 11 29.6	16.42	9 20 33.1	19 44 32.26	7.750	-22 5 47.4	16.86	
10	19 44 58.99	7.753	-22 4 49.1	16.95	10 20 32.3	19 47 38.16	7.742	-21 58 56.2	17.40	
11	19 48 4.97	7.745	-21 57 55.8	17.48	11 20 31.4	19 50 43.86	7.733	-21 51 52.3	17.93	
12	19 51 10.75	7.736	-21 50 49.8	18.01	12 20 30.6	19 53 49.35	7.724	-21 44 35.8	18.45	
13	19 54 16.32	7.727	-21 43 31.2	18.54	13 20 29.7	19 56 54.62	7.715	-21 37 6.7	18.97	
14	19 57 21.67	7.718	-21 36 0.1	19.06	14 20 28.9	19 59 59.67	7.705	-21 29 25.2	19.48	
15	20 0 26.79	7.708	-21 28 16.5	19.57	15 20 28.0	20 3 4.48	7.695	-21 21 31.4	20.00	
16	20 3 31.68	7.698	-21 20 20.6	20.08	16 20 27.1	20 6 9.05	7.685	-21 13 25.4	20.50	
17	20 6 36.32	7.688	-21 12 12.5	20.59	17 20 26.3	20 9 13.36	7.674	-21 5 7.3	21.00	
18	20 9 40.71	7.678	-21 3 52.3	21.09	18 20 25.4	20 12 17.41	7.663	-20 56 37.1	21.50	
19	20 12 44.83	7.667	-20 55 20.0	21.59	19 20 24.5	20 15 21.19	7.651	-20 47 55.1	21.99	
20	20 15 48.68	7.655	-20 46 35.9	22.08	20 20 23.6	20 18 24.68	7.639	-20 39 1.4	22.48	
21	20 18 52.25	7.642	-20 37 40.1	22.57	21 20 22.7	20 21 27.88	7.627	-20 29 56.0	22.97	
22	20 21 55.52	7.630	-20 28 22.6	23.05	22 20 21.8	20 24 30.79	7.614	-20 20 39.1	23.44	
23	20 24 58.49	7.617	-20 19 13.7	23.52	23 20 20.9	20 27 33.30	7.601	-20 11 10.9	23.91	
24	20 28 1.16	7.604	-20 9 43.4	23.99	24 20 20.0	20 30 35.67	7.588	-20 1 31.4	24.37	
25	20 31 3.51	7.591	-20 0 1.9	24.45	25 20 19.1	20 33 37.64	7.575	-19 51 40.9	24.83	
26	20 34 5.54	7.577	-19 50 9.3	24.92	26 20 18.2	20 36 39.29	7.561	-19 41 39.5	25.29	
27	20 37 7.25	7.564	-19 40 5.8	25.37	27 20 17.3	20 39 40.60	7.548	-19 31 27.2	25.73	
28	20 40 8.63	7.551	-19 29 51.5	25.82	28 20 16.4	20 42 41.59	7.534	-19 21 4.1	26.18	
29	20 43 9.68	7.537	-19 19 26.4	26.27	29 20 15.5	20 45 42.25	7.520	-19 10 30.4	26.62	
30	20 46 10.40	7.523	-19 8 50.7	26.71	30 20 14.5	20 48 42.56	7.506	-18 59 46.2	27.05	
31	20 49 10.78	7.509	-18 58 4.5	27.14	31 20 13.6	20 51 42.55	7.492	-18 48 51.7	27.48	
Apr. 1	20 52 10.93	7.495	-18 47 7.9	27.57	1 20 12.6	20 54 42.20	7.478	-18 37 46.9	27.90	
2	20 55 10.54	7.481	-18 36 1.1	28.00	2 20 11.7	20 57 41.51	7.464	-18 26 32.1	28.32	
3	20 58 9.92	7.466	-18 24 44.2	28.41	3 20 10.7	21 0 40.48	7.450	-18 15 7.2	28.74	
4	21 1 8.96	7.452	-18 13 17.3	28.83	4 20 9.8	21 3 39.11	7.436	-18 3 32.6	29.14	
5	21 4 7.65	7.438	-18 1 40.6	29.24	5 20 8.8	21 6 37.40	7.422	-17 51 48.3	29.54	
6	21 7 6.00	7.424	-17 49 54.2	29.63	6 20 7.8	21 9 35.34	7.408	-17 39 54.3	29.95	
7	21 10 4.02	7.410	-17 37 58.3	30.03	7 20 6.9	21 12 32.95	7.393	-17 27 50.8	30.34	
8	21 13 1.69	7.396	-17 25 52.8	30.42	8 20 5.9	21 15 30.21	7.378	-17 15 38.1	30.71	
9	21 15 59.02	7.381	-17 13 38.1	30.80	9 20 4.9	21 18 27.12	7.364	-17 3 16.3	31.09	
10	21 18 56.00	7.367	-17 1 14.3	31.18	10 20 3.9	21 21 23.69	7.350	-16 50 45.5	31.47	
11	21 21 52.64	7.353	-16 48 41.5	31.55	11 20 2.9	21 24 19.92	7.335	-16 38 5.9	31.83	
12	21 24 48.94	7.338	-16 35 59.9	31.91	12 20 1.9	21 27 15.80	7.320	-16 25 17.6	32.19	
13	21 27 44.87	7.323	-16 23 9.7	32.26	13 20 0.8	21 30 11.32	7.306	-16 12 20.8	32.54	
14	21 30 40.46	7.309	-16 10 11.0	32.62	14 19 59.8	21 33 6.47	7.291	-15 59 15.7	32.88	
15	21 33 35.67	7.294	-15 57 4.0	32.96	15 19 58.8	21 36 1.26	7.275	-15 46 2.5	33.21	
16	21 36 30.53	7.278	-15 43 48.8	33.29	16 19 57.8	21 38 55.69	7.260	-15 32 41.3	33.54	
17	21 39 25.01	7.262	-15 30 25.7	33.62	17 19 56.7	21 41 49.75	7.245	-15 19 12.3	33.87	
18	21 42 19.14	7.247	-15 16 54.9	33.94	18 19 55.7	21 44 43.45	7.230	-15 5 35.8	34.18	
19	21 45 12.90	7.232	-15 3 16.5	34.26	19 19 54.6	21 47 36.78	7.214	-14 51 51.9	34.47	
20	21 48 6.29	7.216	-14 49 30.8	34.55	20 19 53.6	21 50 29.73	7.198	-14 38 0.8	34.77	
21	21 50 59.30	7.200	-14 35 37.8	34.85	21 19 52.5	21 53 22.30	7.183	-14 24 2.7	35.07	
22	21 53 51.94	7.185	-14 21 37.8	35.14	22 19 51.4	21 56 14.50	7.167	-14 9 57.6	35.35	
23	21 56 44.19	7.170	-14 7 31.0	35.43	23 19 50.4	21 59 6.31	7.151	-13 55 45.8	35.62	
24	21 59 36.07	7.154	-13 53 17.4	35.70	24 19 49.3	22 1 57.76	7.136	-13 41 27.5	35.89	
25	22 2 27.58	7.138	-13 38 57.3	35.97	25 19 48.2	22 4 48.83	7.120	-13 27 2.8	36.16	
26	22 5 18.72	7.123	-13 24 30.8	36.23	26 19 47.1	22 7 39.54	7.105	-13 12 31.9	36.41	
27	22 8 9.50	7.108	-13 9 58.1	36.49	27 19 46.0	22 10 29.88	7.089	-12 57 54.9	36.66	
28	22 10 59.90	7.092	-12 55 19.4	36.74	28 19 44.9	22 13 19.85	7.074	-12 43 12.0	36.90	
29	22 13 49.94	7.077	-12 40 34.8	36.97	29 19 43.8	22 16 9.46	7.060	-12 28 23.4	37.14	
30	22 16 39.62	7.062	-12 25 44.5	37.21	30 19 42.7	22 18 58.72	7.045	-12 13 29.1	37.37	
31	22 19 28.95	+7.048	-12 10 48.6	+37.44	31 19 41.5	22 21 47.62	+7.031	-11 58 29.4	+37.60	



Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT,				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
May 1	<sup>h</sup> 22 <sup>m</sup> 19 <sup>s</sup> 28.95	+7.048	-12° 10' 48.6"	+37.44	<sup>d</sup> 1 <sup>h</sup> 19 <sup>m</sup> 41.5	<sup>h</sup> 22 <sup>m</sup> 21 <sup>s</sup> 47.62	+7.031	-11° 58' 29.4"	+37.63
2	22 22 17.92	7.034	11 55 47.3	37.67	2 19 40.4	22 24 36.18	7.017	11 43 24.4	37.82
3	22 25 6.55	7.020	11 40 40.6	37.80	3 19 39.3	22 27 24.41	7.002	11 28 14.2	38.03
4	22 27 54.85	7.005	11 25 28.8	38.10	4 19 38.1	22 30 12.30	6.988	11 12 59.1	38.22
5	22 30 42.81	6.991	11 10 12.1	38.30	5 19 37.0	22 32 59.85	6.974	10 57 39.3	38.42
6	22 33 30.44	6.977	10 54 50.6	38.49	6 19 35.9	22 35 47.07	6.960	10 42 14.8	38.61
7	22 36 17.74	6.963	10 39 24.5	38.68	7 19 34.7	22 38 33.97	6.947	10 26 45.7	38.80
8	22 39 4.71	6.949	10 23 53.9	38.86	8 19 33.5	22 41 20.54	6.934	10 11 12.4	38.97
9	22 41 51.35	6.936	10 8 19.1	39.04	9 19 32.4	22 44 6.78	6.920	9 55 35.1	39.14
10	22 44 37.66	6.923	9 52 40.3	39.21	10 19 31.2	22 46 52.69	6.906	9 39 53.8	39.30
11	22 47 23.65	6.909	9 36 57.4	39.37	11 19 30.0	22 49 38.28	6.893	9 24 8.7	39.45
12	22 50 9.31	6.896	9 21 10.8	39.51	12 19 28.8	22 52 23.55	6.879	9 8 20.0	39.59
13	22 52 54.65	6.882	9 5 20.7	39.65	13 19 27.6	22 55 8.50	6.866	8 52 28.0	39.73
14	22 55 39.68	6.869	8 49 27.4	39.79	14 19 26.4	22 57 53.12	6.852	8 36 32.9	39.85
15	22 58 24.38	6.856	8 33 31.0	39.91	15 19 25.2	23 0 37.42	6.839	8 20 34.9	39.97
16	23 1 8.76	6.842	8 17 31.7	40.03	16 19 24.0	23 3 21.40	6.825	8 4 34.3	40.08
17	23 3 52.81	6.828	8 1 29.7	40.13	17 19 22.8	23 6 5.05	6.812	7 48 31.1	40.18
18	23 6 36.53	6.815	7 45 25.2	40.23	18 19 21.6	23 8 48.38	6.799	7 32 25.6	40.28
19	23 9 19.94	6.802	7 29 18.5	40.33	19 19 20.4	23 11 31.38	6.785	7 16 17.9	40.36
20	23 12 3.02	6.788	7 13 9.6	40.41	20 19 19.1	23 14 14.05	6.771	7 0 8.3	40.44
21	23 14 45.77	6.775	6 56 58.8	40.49	21 19 17.9	23 16 56.40	6.758	6 43 56.9	40.51
22	23 17 28.19	6.761	6 40 46.3	40.56	22 19 16.7	23 19 38.43	6.744	6 27 43.9	40.58
23	23 20 10.30	6.748	6 24 32.1	40.61	23 19 15.4	23 22 20.14	6.731	6 11 29.4	40.63
24	23 22 52.09	6.734	6 8 16.5	40.67	24 19 14.2	23 25 1.53	6.718	5 55 13.6	40.67
25	23 25 33.56	6.721	5 51 59.6	40.72	25 19 12.9	23 27 42.61	6.704	5 38 56.7	40.72
26	23 28 14.72	6.708	5 35 41.7	40.76	26 19 11.6	23 30 23.37	6.691	5 22 38.8	40.76
27	23 30 55.56	6.695	5 19 22.8	40.80	27 19 10.4	23 33 3.92	6.679	5 6 20.2	40.79
28	23 33 36.09	6.682	5 3 3.1	40.83	28 19 9.1	23 35 43.97	6.667	4 50 0.9	40.81
29	23 36 16.32	6.670	4 46 42.8	40.85	29 19 7.8	23 38 23.83	6.655	4 33 41.1	40.83
30	23 38 56.25	6.658	4 30 22.1	40.86	30 19 6.6	23 41 3.39	6.642	4 17 21.0	40.84
31	23 41 35.90	6.646	4 14 1.1	40.87	31 19 5.3	23 43 42.67	6.630	4 1 0.8	40.84
June 1	23 44 15.26	6.634	3 57 40.0	40.87	1 19 4.0	23 46 21.66	6.619	3 44 40.5	40.84
2	23 46 54.34	6.622	3 41 18.9	40.87	2 19 2.7	23 49 0.38	6.607	3 28 20.3	40.83
3	23 49 33.14	6.610	3 24 57.8	40.86	3 19 1.4	23 51 38.81	6.595	3 12 4.4	40.82
4	23 52 11.63	6.599	3 8 37.1	40.85	4 19 0.1	23 54 16.96	6.584	2 55 40.9	40.79
5	23 54 49.89	6.587	2 52 16.9	40.82	5 18 58.8	23 56 54.84	6.573	2 39 22.2	40.76
6	23 57 27.85	6.576	2 35 57.4	40.79	6 18 57.5	23 59 32.44	6.561	2 23 4.3	40.72
7	0 0 5.54	6.565	2 19 38.8	40.75	7 18 56.2	0 2 9.76	6.550	2 6 47.3	40.68
8	0 2 42.95	6.553	2 3 21.2	40.70	8 18 54.8	0 4 46.81	6.538	1 50 31.5	40.63
9	0 5 20.09	6.542	1 47 4.8	40.65	9 18 53.5	0 7 23.59	6.527	1 34 17.1	40.57
10	0 7 56.96	6.530	1 30 49.8	40.59	10 18 52.2	0 10 0.10	6.515	1 18 4.3	40.50
11	0 10 33.55	6.518	1 14 36.4	40.52	11 18 50.9	0 12 36.32	6.503	1 1 53.2	40.43
12	0 13 9.86	6.506	0 58 24.8	40.44	12 18 49.5	0 15 12.26	6.491	0 45 44.0	40.34
13	0 15 45.88	6.494	0 42 15.2	40.36	13 18 48.2	0 17 47.90	6.479	0 29 37.0	40.24
14	0 18 21.60	6.482	0 26 7.8	40.26	14 18 46.8	0 20 23.25	6.467	0 13 32.3	40.14
15	0 20 57.03	6.470	0 10 2.7	40.16	15 18 45.5	0 22 58.31	6.454	0 2 29.8	40.03
16	0 23 32.16	6.457	0 5 59.7	40.04	16 18 44.1	0 25 33.06	6.441	0 18 29.2	39.92
17	0 26 6.99	6.444	0 21 59.5	39.93	17 18 42.7	0 28 7.50	6.429	0 34 25.8	39.79
18	0 28 41.51	6.432	0 37 56.3	39.80	18 18 41.4	0 30 41.64	6.416	0 50 19.3	39.66
19	0 31 15.72	6.419	0 53 50.0	39.67	19 18 40.0	0 33 15.46	6.403	1 6 9.7	39.52
20	0 33 49.62	6.406	1 9 40.6	39.53	20 18 38.6	0 35 48.96	6.389	1 21 56.7	39.38
21	0 36 23.21	6.392	1 25 27.8	39.39	21 18 37.2	0 38 22.14	6.376	1 37 40.2	39.24
22	0 38 56.46	6.379	1 41 11.4	39.25	22 18 35.8	0 40 55.00	6.362	1 53 20.1	39.09
23	0 41 29.40	6.365	1 56 51.4	39.09	23 18 34.4	0 43 27.54	6.349	2 8 56.2	38.93
24	0 44 2.01	6.351	2 12 27.5	38.92	24 18 33.0	0 45 59.75	6.335	2 24 28.4	38.76
25	0 46 34.29	6.338	2 27 57.7	38.76	25 18 31.6	0 48 31.62	6.321	2 39 56.5	38.58
26	0 49 6.25	6.324	2 43 27.8	38.58	26 18 30.2	0 51 3.17	6.308	2 55 20.4	38.40
27	0 51 37.87	6.311	2 58 51.7	38.40	27 18 28.8	0 53 34.40	6.295	3 10 40.1	38.22
28	0 54 9.17	6.298	3 14 11.3	38.22	28 18 27.4	0 56 5.30	6.281	3 25 55.4	38.04
29	0 56 40.14	6.284	3 29 26.4	38.04	29 18 25.9	0 58 35.88	6.267	3 41 6.1	37.85
30	0 59 10.79	6.270	3 44 37.0	37.84	30 18 24.5	1 1 6.12	6.253	3 56 12.2	37.65
31	1 1 41.11	+6.256	3 59 42.8	+37.64	31 18 23.1	1 3 36.03	+6.239	4 11 13.4	+37.45

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
1879.		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>s</sup>
July	1	1 1 41.11	+6.256	3 59 42.8	+37.64	1 18 23.1	1 3 36.03	+6.239	4 11 13.4	+37.45
	2	1 4 11.08	6.242	4 14 43.8	37.44	2 18 21.6	1 6 5.59	6.224	4 26 9.7	37.24
	3	1 6 40.72	6.228	4 29 39.8	37.22	3 18 20.2	1 8 34.81	6.210	4 41 1.0	37.02
	4	1 9 10.01	6.213	4 44 30.7	37.01	4 18 18.7	1 11 3.69	6.196	4 55 47.0	36.81
	5	1 11 38.95	6.198	4 59 16.3	36.79	5 18 17.2	1 13 32.21	6.181	5 10 27.6	36.58
	6	1 14 7.54	6.184	5 13 56.5	36.56	6 18 15.8	1 16 0.36	6.165	5 25 2.7	36.34
	7	1 16 35.76	6.168	5 28 31.2	36.33	7 18 14.3	1 18 28.14	6.150	5 39 32.1	36.10
	8	1 19 3.61	6.152	5 43 0.1	36.08	8 18 12.8	1 20 55.55	6.134	5 53 55.7	35.86
	9	1 21 31.07	6.136	5 57 23.2	35.84	9 18 11.3	1 23 22.56	6.117	6 8 13.4	35.61
	10	1 23 58.14	6.119	6 11 40.3	35.59	10 18 9.8	1 25 49.17	6.099	6 22 25.0	35.35
	11	1 26 24.80	6.101	6 25 51.2	35.32	11 18 8.3	1 28 15.35	6.081	6 36 30.2	35.08
	12	1 28 51.03	6.083	6 39 55.8	35.06	12 18 6.8	1 30 41.10	6.063	6 50 29.0	34.81
	13	1 31 16.82	6.065	6 53 53.9	34.78	13 18 5.3	1 33 6.40	6.045	7 4 21.2	34.53
	14	1 33 42.16	6.046	7 7 45.3	34.49	14 18 3.8	1 35 31.24	6.025	7 18 6.6	34.25
	15	1 36 7.03	6.026	7 21 29.9	34.22	15 18 2.2	1 37 55.59	6.004	7 31 45.2	33.96
	16	1 38 31.41	6.005	7 35 7.7	33.93	16 18 0.7	1 40 19.45	5.983	7 45 16.8	33.67
	17	1 40 55.29	5.984	7 48 38.4	33.63	17 17 59.2	1 42 42.79	5.961	7 58 41.3	33.37
	18	1 43 18.65	5.962	8 2 2.0	33.33	18 17 57.6	1 45 5.60	5.939	8 11 58.6	33.07
	19	1 45 41.49	5.939	8 15 18.5	33.03	19 17 56.0	1 47 27.88	5.916	8 25 8.7	32.77
	20	1 48 3.78	5.917	8 28 27.4	32.72	20 17 54.5	1 49 49.60	5.893	8 38 11.3	32.45
	21	1 50 25.51	5.894	8 41 20.0	32.41	21 17 52.9	1 52 10.75	5.869	8 51 6.5	32.14
	22	1 52 46.67	5.869	8 54 23.1	32.09	22 17 51.3	1 54 31.32	5.844	9 3 54.1	31.83
	23	1 55 7.24	5.844	9 7 9.6	31.78	23 17 49.7	1 56 51.30	5.819	9 16 34.1	31.51
	24	1 57 27.22	5.819	9 19 48.4	31.46	24 17 48.1	1 59 10.67	5.794	9 29 6.3	31.18
	25	1 59 46.59	5.794	9 32 19.5	31.14	25 17 46.4	2 1 29.42	5.768	9 41 30.9	30.86
	26	2 2 5.34	5.768	9 44 42.9	30.80	26 17 44.8	2 3 47.53	5.741	9 53 47.6	30.53
	27	2 4 23.45	5.741	9 56 58.5	30.48	27 17 43.2	2 6 5.00	5.714	10 5 56.5	30.20
	28	2 6 40.90	5.713	10 9 6.1	30.15	28 17 41.5	2 8 21.81	5.686	10 17 57.4	29.87
	29	2 8 57.70	5.686	10 21 5.7	29.81	29 17 39.8	2 10 37.95	5.658	10 29 50.2	29.53
	30	2 11 13.82	5.657	10 32 57.3	29.47	30 17 38.2	2 12 53.40	5.629	10 41 35.0	29.21
	31	2 13 29.24	5.628	10 44 40.7	29.13	31 17 36.5	2 15 8.14	5.599	10 53 11.7	28.86
Aug.	1	2 15 43.95	5.597	10 56 16.0	28.80	1 17 34.8	2 17 22.16	5.568	11 4 40.1	28.51
	2	2 17 57.93	5.566	11 7 43.0	28.45	2 17 33.0	2 19 35.43	5.537	11 16 0.2	28.16
	3	2 20 11.15	5.535	11 19 1.8	28.11	3 17 31.3	2 21 47.92	5.504	11 27 12.0	27.82
	4	2 22 23.59	5.502	11 30 12.1	27.75	4 17 29.5	2 23 59.62	5.470	11 38 15.3	27.46
	5	2 24 35.23	5.467	11 41 13.9	27.40	5 17 27.8	2 26 10.49	5.435	11 49 10.1	27.10
	6	2 26 46.03	5.432	11 52 7.2	27.04	6 17 26.0	2 28 20.51	5.399	11 59 56.3	26.74
	7	2 28 55.98	5.396	12 2 51.8	26.68	7 17 24.3	2 30 29.66	5.362	12 10 33.8	26.38
	8	2 31 5.04	5.358	12 13 27.7	26.31	8 17 22.5	2 32 37.90	5.323	12 21 2.6	26.01
	9	2 33 13.18	5.319	12 23 54.8	25.94	9 17 20.6	2 34 45.20	5.283	12 31 22.5	25.64
	10	2 35 20.36	5.279	12 34 13.1	25.58	10 17 18.8	2 36 51.52	5.242	12 41 33.5	25.27
	11	2 37 26.56	5.237	12 44 22.4	25.20	11 17 16.9	2 38 56.83	5.199	12 51 35.5	24.89
	12	2 39 31.74	5.193	12 54 22.6	24.82	12 17 15.1	2 41 1.08	5.155	13 1 28.5	24.52
	13	2 41 35.86	5.148	13 4 13.8	24.44	13 17 13.2	2 43 4.25	5.108	13 11 12.5	24.14
	14	2 43 38.88	5.102	13 13 56.0	24.07	14 17 11.3	2 45 6.30	5.061	13 20 47.4	23.76
	15	2 45 40.77	5.055	13 23 29.1	23.69	15 17 9.4	2 47 7.20	5.013	13 30 13.2	23.39
	16	2 47 41.50	5.005	13 32 53.1	23.31	16 17 7.4	2 49 6.91	4.963	13 39 30.0	23.01
	17	2 49 41.03	4.954	13 42 8.0	22.93	17 17 5.5	2 51 5.41	4.912	13 48 37.6	22.63
	18	2 51 39.33	4.903	13 51 13.8	22.55	18 17 3.5	2 53 2.65	4.859	13 57 36.1	22.24
	19	2 53 36.38	4.850	14 0 10.4	22.17	19 17 2.5	2 54 58.64	4.805	14 6 25.5	21.86
	20	2 55 32.13	4.795	14 8 57.9	21.79	20 16 59.4	2 56 53.28	4.748	14 15 5.8	21.49
	21	2 57 26.54	4.739	14 17 36.3	21.41	21 16 57.4	2 58 46.56	4.691	14 23 37.0	21.11
	22	2 59 19.59	4.681	14 26 5.6	21.03	22 16 55.3	3 0 38.47	4.633	14 31 59.2	20.73
	23	3 1 11.24	4.622	14 34 25.8	20.65	23 16 53.3	3 2 28.95	4.572	14 40 12.4	20.36
	24	3 3 1.45	4.562	14 42 37.1	20.28	24 16 51.2	3 4 17.97	4.511	14 48 16.7	19.99
	25	3 4 50.19	4.500	14 50 39.4	19.91	25 16 49.0	3 6 5.50	4.448	14 56 11.9	19.62
	26	3 6 37.43	4.436	14 58 32.7	19.53	26 16 46.8	3 7 51.49	4.384	15 3 58.2	19.25
	27	3 8 23.12	4.371	15 6 17.1	19.17	27 16 44.6	3 9 35.92	4.318	15 11 35.7	18.87
	28	3 10 7.23	4.305	15 13 52.5	18.79	28 16 42.4	3 11 18.75	4.250	15 19 4.2	18.50
	29	3 11 49.72	4.236	15 21 19.0	18.42	29 16 40.1	3 12 59.94	4.181	15 26 23.9	18.13
	30	3 13 30.55	4.166	15 28 36.7	18.05	30 16 37.9	3 14 39.43	4.110	15 33 34.8	17.77
	31	3 15 9.68	+4.094	+15 35 45.5	+17.68	31 16 35.5	3 16 17.19	+4.037	+15 40 36.8	+17.40

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1		<sup>h</sup> <sup>m</sup> <sup>s</sup> 3 16 47.06	<sup>s</sup> +4.020	<sup>°</sup> <sup>'</sup> <sup>"</sup> +15 42 45.4	<sup>"</sup> +17.31	<sup>d</sup> <sup>h</sup> <sup>m</sup> 1 16 33.2	<sup>h</sup> <sup>m</sup> <sup>s</sup> 3 17 53.18	<sup>s</sup> +3.961	<sup>°</sup> <sup>'</sup> <sup>"</sup> +15 47 29.9	<sup>"</sup> +17.03
2		3 18 22.63	3.943	15 49 36.5	16.94	2 16 30.8	3 19 27.33	3.884	15 54 14.2	16.67
3		3 19 56.35	3.865	15 56 18.7	16.58	3 16 28.4	3 20 59.60	3.804	16 0 49.7	16.30
4		3 21 28.16	3.784	16 2 52.1	16.21	4 16 26.0	3 22 29.92	3.721	16 7 16.5	15.93
5		3 22 58.01	3.701	16 9 16.8	15.84	5 16 23.6	3 23 58.23	3.637	16 13 34.5	15.57
6		3 24 25.83	3.616	16 15 32.6	15.48	6 16 21.1	3 25 24.48	3.550	16 19 43.7	15.20
7		3 25 51.57	3.528	16 21 39.7	15.11	7 16 18.6	3 26 48.61	3.460	16 25 44.2	14.84
8		3 27 15.16	3.437	16 27 38.0	14.74	8 16 16.0	3 28 10.56	3.368	16 31 35.9	14.47
9		3 28 36.55	3.343	16 33 27.6	14.38	9 16 13.4	3 29 30.27	3.273	16 37 18.9	14.11
10		3 29 55.66	3.248	16 39 8.4	14.02	10 16 10.8	3 30 47.68	3.177	16 42 53.2	13.75
11		3 31 12.45	3.150	16 44 40.5	13.65	11 16 8.0	3 32 2.73	3.077	16 48 18.9	13.39
12		3 32 26.84	3.049	16 50 3.9	13.29	12 16 5.3	3 33 15.35	2.974	16 53 35.9	13.03
13		3 33 38.78	2.945	16 55 18.7	12.94	13 16 2.5	3 34 25.49	2.869	16 58 44.4	12.68
14		3 34 48.21	2.839	17 0 25.0	12.59	14 15 59.7	3 35 33.07	2.762	17 3 44.4	12.32
15		3 35 55.07	2.730	17 5 22.8	12.23	15 15 56.9	3 36 38.05	2.652	17 8 36.0	11.97
16		3 36 59.28	2.619	17 10 12.2	11.88	16 15 54.0	3 37 40.36	2.540	17 13 19.2	11.63
17		3 38 0.81	2.506	17 14 53.1	11.53	17 15 51.0	3 38 39.95	2.426	17 17 54.0	11.28
18		3 38 59.59	2.391	17 19 25.7	11.18	18 15 48.0	3 39 36.77	2.309	17 22 20.5	10.94
19		3 39 55.57	2.273	17 23 50.0	10.84	19 15 45.0	3 40 30.76	2.189	17 26 38.8	10.60
20		3 40 48.69	2.153	17 28 6.0	10.50	20 15 41.9	3 41 21.87	2.068	17 30 49.0	10.26
21		3 41 38.91	2.031	17 32 13.9	10.16	21 15 38.8	3 42 10.06	1.946	17 34 51.1	9.92
22		3 42 26.17	1.907	17 36 13.7	9.82	22 15 35.6	3 42 55.28	1.821	17 38 45.1	9.58
23		3 43 10.43	1.781	17 40 5.4	9.48	23 15 32.4	3 43 37.48	1.694	17 42 31.1	9.25
24		3 43 51.64	1.652	17 43 49.1	9.15	24 15 29.1	3 44 16.60	1.564	17 46 9.1	8.92
25		3 44 29.74	1.522	17 47 24.8	8.82	25 15 25.8	3 44 52.58	1.433	17 49 39.2	8.58
26		3 45 4.67	1.388	17 50 52.4	8.48	26 15 22.4	3 45 25.38	1.300	17 53 1.2	8.25
27		3 45 36.39	1.253	17 54 12.0	8.14	27 15 18.9	3 45 54.95	1.164	17 56 15.2	7.92
28		3 46 4.84	1.116	17 57 23.6	7.81	28 15 15.4	3 46 21.23	1.025	17 59 21.1	7.58
29		3 46 29.97	0.976	18 0 27.0	7.47	29 15 11.9	3 46 44.16	0.885	18 2 19.0	7.24
30		3 46 51.73	0.835	18 3 22.4	7.14	30 15 8.3	3 47 3.71	0.743	18 5 8.9	6.90
Oct. 1		3 47 10.07	0.691	18 6 9.8	6.81	1 15 4.6	3 47 19.82	0.598	18 7 50.7	6.57
2		3 47 24.92	0.546	18 8 48.9	6.46	2 15 0.9	3 47 32.44	0.452	18 10 24.3	6.23
3		3 47 36.26	0.398	18 11 19.8	6.12	3 14 57.1	3 47 41.52	0.304	18 12 49.7	5.89
4		3 47 44.02	0.248	18 13 42.6	5.77	4 14 53.3	3 47 47.02	0.154	18 15 6.9	5.55
5		3 47 48.16	+0.096	18 15 57.0	5.43	5 14 49.4	3 47 48.90	+0.002	18 17 15.8	5.20
6		3 47 48.64	-0.057	18 18 3.0	5.08	6 14 45.4	3 47 47.11	-0.152	18 19 16.3	4.84
7		3 47 45.43	0.211	18 20 0.5	4.72	7 14 41.4	3 47 41.62	0.307	18 21 8.3	4.48
8		3 47 38.48	0.367	18 21 49.5	4.36	8 14 37.3	3 47 32.40	0.462	18 22 51.7	4.13
9		3 47 27.77	0.525	18 23 29.9	4.00	9 14 33.2	3 47 19.43	0.619	18 24 26.6	3.77
10		3 47 13.27	0.683	18 25 1.6	3.64	10 14 28.9	3 47 2.69	0.776	18 25 52.7	3.41
11		3 46 54.98	0.841	18 26 24.6	3.27	11 14 24.7	3 46 42.17	0.934	18 27 10.2	3.05
12		3 46 32.88	1.000	18 27 38.7	2.91	12 14 20.3	3 46 17.85	1.091	18 28 18.8	2.68
13		3 46 6.98	1.158	18 28 44.0	2.54	13 14 15.9	3 45 49.78	1.247	18 29 18.7	2.31
14		3 45 37.31	1.314	18 29 40.5	2.17	14 14 11.5	3 45 18.00	1.402	18 30 9.7	1.94
15		3 45 3.91	1.469	18 30 28.1	1.80	15 14 6.9	3 44 42.51	1.555	18 30 51.8	1.57
16		3 44 26.80	1.622	18 31 6.7	1.42	16 14 2.4	3 44 3.37	1.706	18 31 25.0	1.19
17		3 43 46.02	1.774	18 31 36.2	1.04	17 13 57.7	3 43 20.62	1.855	18 31 49.2	0.82
18		3 43 1.63	1.924	18 31 56.7	0.66	18 13 53.0	3 42 34.32	2.002	18 32 4.4	0.45
19		3 42 13.69	2.070	18 32 8.2	+ 0.29	19 13 48.3	3 41 44.53	2.145	18 32 10.7	+ 0.07
20		3 41 22.29	2.212	18 32 10.6	- 0.09	20 13 43.5	3 40 51.35	2.284	18 32 7.9	- 0.30
21		3 40 27.51	2.350	18 32 3.9	0.47	21 13 38.6	3 39 54.89	2.420	18 31 56.1	0.67
22		3 39 29.45	2.486	18 31 48.2	0.84	22 13 33.7	3 38 55.22	2.552	18 31 35.4	1.05
23		3 38 28.20	2.616	18 31 23.5	1.22	23 13 28.7	3 37 52.43	2.679	18 31 5.6	1.43
24		3 37 23.87	2.742	18 30 49.7	1.60	24 13 23.7	3 36 46.66	2.800	18 30 26.9	1.80
25		3 36 16.58	2.862	18 30 6.9	1.96	25 13 18.6	3 35 38.03	2.917	18 29 39.4	2.16
26		3 35 6.47	2.977	18 29 15.3	2.33	26 13 13.5	3 34 26.67	3.028	18 28 43.2	2.52
27		3 33 53.65	3.087	18 28 15.0	2.70	27 13 8.3	3 33 12.70	3.133	18 27 38.3	2.88
28		3 32 38.28	3.190	18 27 5.9	3.06	28 13 3.1	3 31 56.27	3.232	18 26 24.9	3.23
29		3 31 20.51	3.287	18 25 48.4	3.41	29 12 57.9	3 30 37.55	3.324	18 25 3.1	3.58
30		3 30 0.49	3.377	18 24 22.5	3.75	30 12 52.6	3 29 16.68	3.411	18 23 33.0	3.92
31		3 28 38.39	3.461	18 22 48.4	4.09	31 12 47.3	3 27 53.85	3.490	18 21 54.9	4.25
32		3 27 14.36	-3.538	+18 21 6.3	- 4.41	32 12 42.0	3 26 29.17	-3.562	+18 20 9.1	- 4.56

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
1879.		h m s	s	° ' "	"	d h m	h m s	s	° ' "	"
Nov. 1	3 27 14.36	-3.538	+18 21' 6.3	-4.41	1 12 42.0	3 26 29.17	-3.562	+18 20' 9.1	-4.56	
2	3 25 48.57	3.607	18 19 16.6	4.72	2 12 36.6	3 25 2.85	3.627	18 18 15.9	4.87	
3	3 24 21.20	3.669	18 17 19.5	5.03	3 12 31.2	3 23 35.06	3.654	18 16 15.5	5.16	
4	3 22 52.46	3.722	18 15 15.3	5.31	4 12 25.8	3 22 6.01	3.732	18 14 8.3	5.44	
5	3 21 22.53	3.767	18 13 4.5	5.58	5 12 20.3	3 20 35.50	3.772	18 11 54.7	5.69	
6	3 19 51.64	3.803	18 10 47.6	5.82	6 12 14.9	3 19 4.94	3.803	18 9 35.3	5.92	
7	3 18 20.00	3.830	18 8 24.9	6.05	7 12 9.4	3 17 33.36	3.825	18 7 10.5	6.13	
8	3 16 47.81	3.848	18 5 57.1	6.25	8 12 4.0	3 16 1.31	3.840	18 4 41.0	6.32	
9	3 15 15.28	3.858	18 3 24.7	6.43	9 11 58.5	3 14 29.04	3.844	18 2 7.2	6.48	
10	3 13 42.65	3.857	18 0 48.4	6.59	10 11 53.0	3 12 56.79	3.838	17 59 29.8	6.62	
11	3 12 10.15	3.846	17 58 8.7	6.71	11 11 47.6	3 11 24.80	3.823	17 56 49.3	6.74	
12	3 10 38.00	3.827	17 55 26.3	6.81	12 11 42.1	3 9 53.28	3.800	17 54 6.5	6.82	
13	3 9 6.44	3.798	17 52 42.0	6.87	13 11 36.7	3 8 22.43	3.767	17 51 22.1	6.87	
14	3 7 35.68	3.761	17 49 56.4	6.91	14 11 31.3	3 6 52.47	3.725	17 48 36.7	6.89	
15	3 6 5.92	3.715	17 47 10.2	6.92	15 11 25.9	3 5 23.60	3.676	17 45 51.1	6.88	
16	3 4 37.36	3.661	17 44 24.2	6.90	16 11 20.5	3 3 56.01	3.619	17 43 6.0	6.85	
17	3 3 10.22	3.598	17 41 39.1	6.85	17 11 15.1	3 2 29.90	3.553	17 40 22.2	6.79	
18	3 1 44.67	3.527	17 38 55.6	6.77	18 11 9.8	3 1 5.48	3.479	17 37 40.3	6.69	
19	3 0 20.92	3.448	17 36 14.4	6.65	19 11 4.5	2 59 42.93	3.397	17 35 1.1	6.57	
20	2 58 59.15	3.363	17 33 36.3	6.52	20 10 59.2	2 58 22.41	3.309	17 32 25.1	6.42	
21	2 57 39.52	3.271	17 31 1.8	6.34	21 10 54.0	2 57 4.10	3.214	17 29 53.1	6.23	
22	2 56 22.17	3.173	17 28 51.7	6.15	22 10 48.8	2 55 48.10	3.115	17 27 25.8	6.03	
23	2 55 7.23	3.069	17 26 6.7	5.92	23 10 43.6	2 54 34.56	3.011	17 25 3.8	5.80	
24	2 53 54.84	2.961	17 23 47.3	5.68	24 10 38.5	2 53 23.59	2.901	17 22 47.5	5.55	
25	2 52 45.11	2.848	17 21 34.1	5.41	25 10 33.4	2 52 15.30	2.787	17 20 37.6	5.27	
26	2 51 38.13	2.731	17 19 27.7	5.12	26 10 28.4	2 51 9.80	2.670	17 18 34.7	4.96	
27	2 50 34.01	2.610	17 17 28.5	4.80	27 10 23.4	2 50 7.16	2.549	17 16 39.3	4.64	
28	2 49 32.82	2.487	17 15 37.0	4.47	28 10 18.5	2 49 7.46	2.425	17 14 51.7	4.31	
29	2 48 34.63	2.360	17 13 53.8	4.12	29 10 13.6	2 48 10.77	2.298	17 13 12.4	3.96	
30	2 47 39.51	2.231	17 12 19.3	3.75	30 10 8.8	2 47 17.15	2.169	17 11 41.9	3.58	
Dec. 1	2 46 47.52	2.100	17 10 53.8	3.36	1 10 4.0	2 46 26.66	2.038	17 10 20.6	3.19	
2	2 45 58.70	1.966	17 9 37.6	2.97	2 9 59.3	2 45 39.34	1.905	17 9 8.7	2.79	
3	2 45 13.11	1.831	17 8 31.2	2.56	3 9 54.7	2 44 55.25	1.770	17 8 6.7	2.37	
4	2 44 30.78	1.695	17 7 34.8	2.13	4 9 50.1	2 44 14.39	1.634	17 7 14.7	1.94	
5	2 43 51.74	1.558	17 6 48.8	1.70	5 9 45.5	2 43 36.81	1.497	17 6 33.1	1.51	
6	2 43 16.01	1.420	17 6 13.4	1.25	6 9 41.0	2 43 2.54	1.359	17 6 2.2	1.06	
7	2 42 43.62	1.280	17 5 48.9	0.79	7 9 36.6	2 42 31.59	1.220	17 5 42.1	0.61	
8	2 42 14.57	1.140	17 5 35.4	-0.33	8 9 32.2	2 42 3.97	1.081	17 5 33.2	-0.14	
9	2 41 48.89	1.000	17 5 33.3	+0.15	9 9 27.9	2 41 39.68	0.942	17 5 35.5	+0.34	
10	2 41 26.56	0.860	17 5 42.5	+0.62	10 9 23.6	2 41 18.74	0.803	17 5 49.2	+0.80	
11	2 41 7.61	0.719	17 6 3.2	1.10	11 9 19.3	2 41 1.15	0.664	17 6 14.4	1.29	
12	2 40 52.01	0.580	17 6 35.5	1.59	12 9 15.1	2 40 46.89	0.525	17 6 51.1	1.77	
13	2 40 39.76	0.441	17 7 19.4	2.07	13 9 11.0	2 40 35.95	0.387	17 7 39.4	2.25	
14	2 40 30.84	0.303	17 8 15.0	2.56	14 9 7.0	2 40 28.31	0.250	17 8 39.2	2.73	
15	2 40 25.23	0.166	17 9 22.2	3.04	15 9 3.0	2 40 23.95	-0.114	17 9 50.6	3.21	
16	2 40 22.89	-0.030	17 10 40.9	3.52	16 8 59.0	2 40 22.85	+0.021	17 11 13.4	3.69	
17	2 40 23.81	+0.105	17 12 11.2	4.00	17 8 55.1	2 40 24.97	0.154	17 12 47.7	4.17	
18	2 40 27.94	0.238	17 13 53.0	4.47	18 8 51.3	2 40 30.27	0.266	17 14 33.4	4.63	
19	2 40 35.24	0.369	17 15 46.1	4.94	19 8 47.5	2 40 38.70	0.416	17 16 30.2	5.10	
20	2 40 45.67	0.499	17 17 50.2	5.40	20 8 43.8	2 40 50.24	0.545	17 18 38.0	5.56	
21	2 40 59.19	0.627	17 20 5.3	5.85	21 8 40.1	2 41 4.84	0.671	17 20 56.7	5.99	
22	2 41 15.76	0.752	17 22 31.0	6.29	22 8 36.4	2 41 22.43	0.795	17 23 25.8	6.43	
23	2 41 35.30	0.875	17 25 7.3	6.73	23 8 32.8	2 41 42.96	0.916	17 26 5.4	6.86	
24	2 41 57.75	0.995	17 27 53.9	7.15	24 8 29.3	2 42 6.38	1.035	17 28 55.2	7.28	
25	2 42 23.08	1.113	17 30 50.6	7.57	25 8 25.8	2 42 32.63	1.152	17 31 54.9	7.69	
26	2 42 51.21	1.229	17 33 57.1	7.97	26 8 22.4	2 43 1.67	1.267	17 35 4.3	8.09	
27	2 43 22.10	1.343	17 37 13.1	8.36	27 8 19.0	2 43 23.43	1.379	17 38 23.2	8.47	
28	2 43 55.68	1.454	17 40 38.4	8.75	28 8 15.6	2 44 7.85	1.489	17 41 51.2	8.86	
29	2 44 31.92	1.563	17 44 12.9	9.13	29 8 12.3	2 44 44.90	1.597	17 45 28.3	9.23	
30	2 44 10.76	1.671	17 47 56.3	9.49	30 8 9.0	2 45 24.53	1.703	17 49 14.1	9.58	
31	2 45 52.14	1.777	17 51 48.2	9.84	31 8 5.8	2 46 6.68	1.808	17 53 8.4	9.93	
32	2 46 36.03	+1.880	+17 55 48.4	+10.15	32 8 2.6	2 46 51.30	+1.910	+17 57 10.8	+10.26	

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
1879.		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>″</sup>	<sup>″</sup>	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>″</sup>	<sup>″</sup>
Jan.	1	20 53 12.51	+2.257	-18 13' 46.3	+ 9.06	1 2 9.0	20 53 17.36	+2.253	-18 13' 26.8	+ 9.05
	2	20 54 6.77	2.264	18 10 8.1	9.13	2 2 6.0	20 54 11.52	2.260	18 9 48.9	9.12
	3	20 55 1.20	2.271	18 6 28.2	9.20	3 2 3.0	20 55 5.85	2.267	18 6 9.3	9.19
	4	20 55 55.80	2.278	18 2 46.7	9.27	4 1 59.9	20 56 0.35	2.274	18 2 28.2	9.26
	5	20 56 50.56	2.285	17 59 3.5	9.34	5 1 56.9	20 56 56.01	2.280	17 58 45.3	9.33
	6	20 57 45.46	2.291	17 55 18.7	9.40	6 1 53.9	20 57 49.81	2.286	17 55 0.9	9.39
	7	20 58 40.41	2.297	17 51 32.2	9.47	7 1 50.9	20 58 44.76	2.292	17 51 14.7	9.46
	8	20 59 35.71	2.303	17 47 44.1	9.54	8 1 47.8	20 59 39.85	2.298	17 47 27.0	9.53
	9	21 0 31.05	2.309	17 43 54.5	9.60	9 1 44.8	21 0 35.08	2.304	17 43 37.7	9.59
	10	21 1 26.52	2.314	17 40 3.3	9.67	10 1 41.8	21 1 30.45	2.309	17 39 46.9	9.65
	11	21 2 22.11	2.319	17 36 10.6	9.73	11 1 38.8	21 2 25.93	2.314	17 35 54.6	9.71
	12	21 3 17.82	2.324	17 32 16.3	9.80	12 1 35.8	21 3 21.53	2.319	17 32 0.7	9.78
	13	21 4 13.64	2.329	17 28 20.5	9.86	13 1 32.8	21 4 17.24	2.324	17 28 5.3	9.84
	14	21 5 9.57	2.333	17 24 23.2	9.92	14 1 29.8	21 5 13.06	2.328	17 24 8.4	9.90
	15	21 6 5.60	2.337	17 20 24.4	9.98	15 1 26.8	21 6 8.98	2.332	17 20 10.0	9.96
	16	21 7 1.73	2.341	17 16 24.1	10.04	16 1 23.8	21 7 5.00	2.336	17 16 10.1	10.02
	17	21 7 57.95	2.345	17 12 22.4	10.10	17 1 20.8	21 8 1.11	2.340	17 12 8.8	10.08
	18	21 8 54.26	2.348	17 8 19.3	10.16	18 1 17.8	21 8 57.31	2.343	17 8 6.1	10.14
	19	21 9 50.66	2.351	17 4 14.8	10.22	19 1 14.8	21 9 53.59	2.346	17 4 2.0	10.20
	20	21 10 47.12	2.354	17 0 9.0	10.28	20 1 11.8	21 10 49.94	2.349	16 59 56.6	10.26
	21	21 11 43.65	2.357	16 56 1.8	10.33	21 1 8.8	21 11 46.36	2.352	16 55 49.9	10.31
	22	21 12 40.25	2.359	16 51 53.3	10.38	22 1 5.8	21 12 42.84	2.354	16 51 41.9	10.36
	23	21 13 36.90	2.361	16 47 43.6	10.43	23 1 2.8	21 13 39.38	2.356	16 47 32.6	10.41
	24	21 14 33.60	2.363	16 43 32.6	10.48	24 0 59.9	21 14 35.96	2.358	16 43 22.1	10.46
	25	21 15 30.34	2.365	16 39 20.4	10.53	25 0 56.9	21 15 32.58	2.360	16 39 10.4	10.51
	26	21 16 27.12	2.366	16 35 7.0	10.58	26 0 53.9	21 16 29.24	2.361	16 34 57.5	10.56
	27	21 17 23.92	2.367	16 30 52.4	10.63	27 0 50.9	21 17 25.92	2.362	16 30 43.4	10.61
	28	21 18 20.74	2.368	16 26 36.7	10.68	28 0 47.9	21 18 22.63	2.363	16 26 28.2	10.66
	29	21 19 17.58	2.369	16 22 19.9	10.73	29 0 44.9	21 19 19.35	2.364	16 22 11.9	10.70
	30	21 20 14.43	2.369	16 18 2.1	10.77	30 0 41.9	21 20 16.08	2.364	16 17 54.6	10.74
	31	21 21 11.29	2.369	16 13 43.3	10.81	31 0 38.9	21 21 12.83	2.364	16 13 36.3	10.78
Feb.	1	21 22 8.15	2.369	16 9 23.4	10.85	1 0 36.0	21 22 9.57	2.364	16 9 17.0	10.82
	2	21 23 5.01	2.369	16 5 2.5	10.89	2 0 33.0	21 23 6.31	2.364	16 4 56.6	10.86
	3	21 24 1.87	2.369	16 0 40.7	10.93	3 0 30.0	21 24 3.05	2.364	16 0 35.3	10.90
	4	21 24 58.71	2.368	15 56 17.9	10.97	4 0 27.0	21 24 59.78	2.363	15 56 13.0	10.93
	5	21 25 55.53	2.367	15 51 54.2	11.01	5 0 24.0	21 25 56.48	2.362	15 51 49.6	10.96
	6	21 26 52.33	2.366	15 47 29.6	11.05	6 0 21.0	21 26 53.16	2.361	15 47 25.7	11.00
	7	21 27 49.10	2.365	15 43 4.2	11.09	7 0 18.0	21 27 49.81	2.360	15 43 0.8	11.04
	8	21 28 45.85	2.364	15 38 37.9	11.12	8 0 15.0	21 28 46.44	2.359	15 38 35.1	11.08
	9	21 29 42.56	2.362	15 34 10.8	11.15	9 0 12.0	21 29 43.03	2.357	15 34 8.6	11.12
	10	21 30 39.23	2.360	15 29 42.9	11.18	10 0 9.0	21 30 39.58	2.355	15 29 41.3	11.15
	11	21 31 35.85	2.358	15 25 14.3	11.21	11 0 6.0	21 31 36.09	2.353	15 25 13.2	11.18
	12	21 32 32.43	2.356	15 20 45.0	11.24	12 0 3.0	21 32 32.55	2.351	15 20 44.4	11.21
	13	21 33 28.96	2.354	15 16 14.9	11.27	13 0 0.0	21 33 28.95	2.349	15 16 14.9	11.24
	14	21 34 25.43	2.352	15 11 44.2	11.30	13 23 57.0	21 34 25.29	2.347	15 11 44.9	11.27
	15	21 35 21.83	2.349	15 7 12.8	11.32	14 23 54.0	21 35 21.58	2.344	15 7 14.2	11.30
	16	21 36 18.17	2.346	15 2 40.8	11.34	15 23 51.0	21 36 17.80	2.341	15 2 42.8	11.32
	17	21 37 14.43	2.343	14 58 8.3	11.36	16 23 48.0	21 37 13.94	2.338	14 58 10.8	11.34
	18	21 38 10.61	2.340	14 53 35.3	11.38	17 23 45.0	21 38 10.00	2.335	14 53 38.3	11.36
	19	21 39 6.71	2.336	14 49 1.8	11.40	18 23 42.0	21 39 5.08	2.331	14 49 5.4	11.38
	20	21 40 2.72	2.332	14 44 27.9	11.42	19 23 39.0	21 40 1.87	2.327	14 44 32.0	11.40
	21	21 40 58.63	2.328	14 39 53.5	11.44	20 23 36.0	21 40 57.67	2.323	14 39 58.3	11.42
	22	21 41 54.44	2.324	14 35 18.7	11.46	21 23 33.0	21 41 53.37	2.319	14 35 24.1	11.44
	23	21 42 50.15	2.319	14 30 43.6	11.47	22 23 30.0	21 42 48.96	2.314	14 30 49.5	11.45
	24	21 43 45.74	2.314	14 26 8.2	11.48	23 23 27.0	21 43 44.44	2.309	14 26 14.7	11.46
	25	21 44 41.22	2.309	14 21 32.5	11.49	24 23 24.0	21 44 39.80	2.304	14 21 30.6	11.47
	26	21 45 36.57	2.304	14 16 56.6	11.50	25 23 21.0	21 45 35.04	2.299	14 17 4.2	11.48
	27	21 46 31.80	2.299	14 12 20.5	11.51	26 23 18.0	21 46 30.16	2.294	14 12 28.7	11.49
	28	21 47 26.89	2.293	14 7 44.2	11.51	27 23 15.0	21 47 25.15	2.288	14 7 53.0	11.49
	29	21 48 21.85	2.287	14 3 7.8	11.52	28 23 12.0	21 48 20.00	2.282	14 3 17.2	11.50
	30	21 49 16.67	+2.281	-13 58 31.4	+11.52	29 23 8.9	21 49 14.71	2.276	13 58 41.3	11.50
						30 23 5.9	21 50 9.27	+2.270	-13 54 5.4	+11.50

Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	21 48 21.85	+2.287	14 3 7.8	+11.52	1 23 8.9	21 49 14.71	+2.276	13 58 41.3	+11.50
2	21 49 16.67	2.281	13 58 31.4	11.52	2 23 5.9	21 50 9.27	2.270	13 54 5.4	11.50
3	21 50 11.34	2.275	13 53 54.9	11.52	3 23 2.9	21 51 3.68	2.264	13 49 29.5	11.50
4	21 51 5.85	2.269	13 49 18.4	11.52	4 22 59.8	21 51 57.93	2.258	13 44 53.6	11.50
5	21 52 0.22	2.263	13 44 41.9	11.52	5 22 56.8	21 52 52.03	2.251	13 40 17.7	11.49
6	21 52 54.43	2.256	13 40 5.5	11.51	6 22 53.8	21 53 45.07	2.244	13 35 42.0	11.49
7	21 53 48.48	2.249	13 35 29.2	11.51	7 22 50.7	21 54 39.75	2.237	13 31 6.4	11.48
8	21 54 42.36	2.242	13 30 53.0	11.51	8 22 47.7	21 55 33.36	2.230	13 26 30.9	11.48
9	21 55 36.07	2.235	13 26 16.8	11.50	9 22 44.6	21 56 26.79	2.223	13 21 55.4	11.47
10	21 56 29.61	2.228	13 21 40.7	11.50	10 22 41.6	21 57 20.05	2.216	13 17 20.1	11.46
11	21 57 22.97	2.220	13 17 4.9	11.49	11 22 38.5	21 58 13.13	2.208	13 12 45.1	11.45
12	21 58 16.15	2.212	13 12 29.3	11.48	12 22 35.5	21 59 6.02	2.200	13 8 10.3	11.44
13	21 59 9.15	2.204	13 7 54.0	11.47	13 22 32.4	21 59 58.73	2.192	13 3 35.9	11.43
14	22 0 1.96	2.196	13 3 19.0	11.46	14 22 29.4	22 0 51.24	2.184	12 59 1.9	11.41
15	22 0 54.57	2.188	12 58 44.4	11.44	15 22 26.3	22 1 43.55	2.176	12 54 28.3	11.39
16	22 1 46.97	2.180	12 54 10.2	11.42	16 22 23.3	22 2 35.65	2.167	12 49 55.1	11.37
17	22 2 39.17	2.171	12 49 36.4	11.40	17 22 20.2	22 3 27.54	2.158	12 45 22.3	11.35
18	22 3 31.16	2.162	12 45 3.1	11.38	18 22 17.1	22 4 19.22	2.149	12 40 50.1	11.33
19	22 4 22.94	2.153	12 40 30.4	11.36	19 22 14.1	22 5 10.68	2.140	12 36 18.5	11.31
20	22 5 14.50	2.144	12 35 58.3	11.33	20 22 11.0	22 6 1.92	2.130	12 31 47.5	11.28
21	22 6 5.83	2.134	12 31 26.7	11.30	21 22 7.9	22 6 52.93	2.120	12 27 17.1	11.25
22	22 6 56.93	2.124	12 26 55.8	11.27	22 22 4.8	22 7 43.70	2.110	12 22 47.4	11.22
23	22 7 47.79	2.114	12 22 25.6	11.24	23 22 1.7	22 8 34.23	2.100	12 18 18.5	11.19
24	22 8 38.40	2.104	12 17 56.1	11.21	24 21 58.6	22 9 24.51	2.090	12 13 50.3	11.16
25	22 9 28.76	2.094	12 13 27.4	11.18	25 21 55.5	22 10 14.53	2.079	12 9 22.9	11.13
26	22 10 18.87	2.083	12 8 59.5	11.14	26 21 52.4	22 11 4.30	2.068	12 4 56.4	11.09
27	22 11 8.73	2.072	12 4 32.5	11.10	27 21 49.3	22 11 53.81	2.057	12 0 30.8	11.05
28	22 11 58.33	2.061	12 0 6.5	11.06	28 21 46.2	22 12 43.06	2.046	11 56 6.2	11.01
29	22 12 47.67	2.050	11 55 41.4	11.02	29 21 43.0	22 13 32.04	2.035	11 51 42.6	10.97
30	22 13 36.73	2.039	11 51 17.3	10.98	30 21 39.9	22 14 20.75	2.024	11 47 20.0	10.93
31	22 14 25.51	2.027	11 46 54.3	10.94	31 21 36.8	22 15 9.17	2.012	11 42 58.5	10.88
Apr. 1	22 15 14.00	2.015	11 42 32.3	10.89	1 21 33.7	22 15 57.30	2.000	11 38 38.1	10.83
2	22 16 2.21	2.003	11 38 11.4	10.84	2 21 30.5	22 16 45.15	1.988	11 34 28.8	10.78
3	22 16 50.13	1.991	11 33 51.7	10.79	3 21 27.4	22 17 32.70	1.976	11 30 0.7	10.73
4	22 17 37.76	1.979	11 29 33.1	10.74	4 21 24.2	22 18 19.96	1.964	11 25 43.7	10.68
5	22 18 25.09	1.966	11 25 15.8	10.69	5 21 21.0	22 19 6.92	1.951	11 21 28.1	10.63
6	22 19 12.12	1.953	11 20 59.7	10.64	6 21 17.9	22 19 53.58	1.938	11 17 13.7	10.57
7	22 19 58.85	1.940	11 16 44.9	10.59	7 21 14.8	22 20 39.93	1.925	11 13 0.6	10.51
8	22 20 45.27	1.927	11 12 31.4	10.54	8 21 11.6	22 21 25.97	1.912	11 8 48.9	10.45
9	22 21 31.37	1.914	11 8 19.3	10.48	9 21 8.5	22 22 11.69	1.899	11 4 38.6	10.39
10	22 22 17.16	1.901	11 4 8.6	10.42	10 21 5.3	22 22 57.10	1.885	11 0 29.7	10.33
11	22 23 2.62	1.887	10 59 59.3	10.36	11 21 2.1	22 23 42.17	1.871	10 56 22.3	10.27
12	22 23 47.75	1.873	10 55 51.5	10.30	12 20 58.9	22 24 26.91	1.857	10 52 16.4	10.21
13	22 24 32.55	1.859	10 51 45.3	10.23	13 20 55.7	22 25 11.31	1.843	10 48 12.1	10.14
14	22 25 17.01	1.845	10 47 40.7	10.16	14 20 52.5	22 25 55.37	1.829	10 44 9.5	10.07
15	22 26 1.12	1.831	10 43 37.8	10.09	15 20 49.3	22 26 39.08	1.814	10 40 8.6	10.00
16	22 26 44.88	1.816	10 39 36.5	10.02	16 20 46.1	22 27 22.43	1.799	10 36 9.4	9.93
17	22 27 28.28	1.801	10 35 37.0	9.95	17 20 42.9	22 28 5.42	1.784	10 32 12.0	9.86
18	22 28 11.32	1.786	10 31 39.3	9.87	18 20 39.6	22 28 48.05	1.769	10 28 16.4	9.78
19	22 28 53.99	1.771	10 27 43.5	9.79	19 20 36.4	22 29 30.30	1.753	10 24 22.7	9.70
20	22 29 36.29	1.755	10 23 49.5	9.71	20 20 33.1	22 30 12.18	1.737	10 20 30.9	9.62
21	22 30 18.21	1.739	10 19 57.4	9.63	21 20 29.9	22 30 53.68	1.721	10 16 41.0	9.54
22	22 30 59.75	1.723	10 16 7.3	9.55	22 20 26.6	22 31 34.80	1.705	10 12 53.1	9.45
23	22 31 40.90	1.706	10 12 19.3	9.46	23 20 23.4	22 32 15.52	1.688	10 9 7.4	9.36
24	22 32 21.65	1.689	10 8 33.4	9.37	24 20 20.1	22 32 55.84	1.671	10 5 23.8	9.27
25	22 33 1.99	1.672	10 4 49.6	9.28	25 20 16.9	22 33 35.74	1.654	10 1 42.3	9.18
26	22 33 41.93	1.655	10 1 8.0	9.19	26 20 13.6	22 34 15.24	1.637	9 58 3.1	9.09
27	22 34 21.45	1.638	9 57 28.6	9.10	27 20 10.3	22 34 54.32	1.619	9 54 26.1	9.00
28	22 35 0.55	1.620	9 53 51.5	9.01	28 20 7.0	22 35 32.98	1.601	9 50 51.4	8.90
29	22 35 39.22	1.602	9 50 16.6	8.91	29 20 3.7	22 36 11.20	1.583	9 47 18.9	8.80
30	22 36 17.46	1.584	9 46 44.1	8.81	30 20 0.4	22 36 48.99	1.565	9 43 48.8	8.70
31	22 36 55.27	+1.566	9 43 13.9	+ 8.71	31 19 57.1	22 37 26.35	+1.547	9 40 21.1	+ 8.60

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT,					
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
May 1		<sup>h</sup> 22 <sup>m</sup> 36 <sup>s</sup> 55.27	+1.566	<sup>°</sup> 9 <sup>'</sup> 43 <sup>"</sup> 13.9	+ 8.71	<sup>d</sup> 1 <sup>h</sup> 19 <sup>m</sup> 57.1	<sup>h</sup> 22 <sup>m</sup> 37 <sup>s</sup> 26.35	+1.547	<sup>°</sup> 9 <sup>'</sup> 40 <sup>"</sup> 21.1	+ 8.60	
2		22 37 32.63	1.548	9 39 46.1	8.61	2 19 53.8	22 38 3.26	1.529	9 36 55.8	8.50	
3		22 38 9.55	1.530	9 36 20.8	8.51	3 19 50.5	22 38 39.72	1.511	9 33 33.0	8.40	
4		22 38 46.02	1.511	9 32 57.9	8.41	4 19 47.2	22 39 15.73	1.492	9 30 12.7	8.30	
5		22 39 22.04	1.492	9 29 37.6	8.30	5 19 43.9	22 39 51.29	1.473	9 26 55.0	8.19	
6		22 39 57.62	1.473	9 26 19.9	8.19	6 19 40.6	22 40 26.41	1.454	9 23 39.9	8.08	
7		22 40 32.75	1.454	9 23 4.7	8.08	7 19 37.2	22 41 1.08	1.434	9 20 27.3	7.97	
8		22 41 7.40	1.434	9 19 52.2	7.97	8 19 33.8	22 41 35.27	1.414	9 17 17.5	7.86	
9		22 41 41.58	1.414	9 16 42.4	7.85	9 19 30.4	22 42 8.98	1.394	9 14 10.4	7.74	
10		22 42 25.28	1.394	9 13 35.4	7.73	10 19 27.0	22 42 52.21	1.374	9 11 6.1	7.62	
11		22 42 48.49	1.374	9 10 31.2	7.61	11 19 23.6	22 43 14.95	1.354	9 8 4.6	7.50	
12		22 43 21.21	1.353	9 7 29.9	7.49	12 19 20.2	22 43 47.19	1.333	9 5 6.1	7.38	
13		22 43 53.43	1.332	9 4 31.5	7.37	13 19 16.8	22 44 18.93	1.312	9 2 10.5	7.26	
14		22 44 25.15	1.311	9 1 36.1	7.25	14 19 13.4	22 44 50.17	1.291	8 59 17.9	7.13	
15		22 44 56.36	1.290	8 58 43.6	7.12	15 19 10.0	22 45 20.89	1.269	8 56 28.2	7.00	
16		22 45 27.05	1.268	8 55 54.2	6.99	16 19 6.5	22 45 51.09	1.247	8 53 41.7	6.87	
17		22 45 57.22	1.246	8 53 7.9	6.86	17 19 3.0	22 46 20.77	1.225	8 50 58.3	6.74	
18		22 46 26.86	1.224	8 50 24.8	6.73	18 18 59.6	22 46 49.92	1.203	8 48 18.1	6.61	
19		22 46 55.95	1.201	8 47 44.9	6.60	19 18 56.2	22 47 18.51	1.181	8 45 41.2	6.48	
20		22 47 24.51	1.178	8 45 8.2	6.46	20 18 52.7	22 47 46.57	1.158	8 43 7.5	6.34	
21		22 47 52.52	1.155	8 42 34.8	6.32	21 18 49.3	22 48 14.08	1.135	8 40 37.1	6.20	
22		22 48 19.97	1.132	8 40 4.8	6.18	22 18 45.8	22 48 41.03	1.112	8 38 10.1	6.06	
23		22 48 46.26	1.109	8 37 38.2	6.04	23 18 42.3	22 49 7.41	1.088	8 35 46.5	5.92	
24		22 49 13.19	1.085	8 35 15.0	5.90	24 18 38.8	22 49 33.23	1.064	8 33 26.3	5.78	
25		22 49 38.95	1.061	8 32 55.2	5.75	25 18 35.3	22 49 58.48	1.040	8 31 9.5	5.63	
26		22 50 4.13	1.037	8 30 38.9	5.60	26 18 31.8	22 50 23.15	1.016	8 28 56.3	5.48	
27		22 50 28.72	1.013	8 28 26.2	5.45	27 18 28.3	22 50 47.23	0.992	8 26 46.6	5.33	
28		22 50 52.73	0.988	8 26 17.0	5.30	28 18 24.7	22 51 10.73	0.967	8 24 40.5	5.18	
29		22 51 16.15	0.963	8 24 11.4	5.15	29 18 21.2	22 51 33.64	0.942	8 22 38.0	5.03	
30		22 51 38.97	0.938	8 22 9.5	5.00	30 18 17.6	22 51 55.95	0.917	8 20 39.2	4.88	
31		22 52 1.20	0.913	8 20 11.3	4.85	31 18 14.0	22 52 17.66	0.892	8 18 44.1	4.72	
June 1		22 52 22.81	0.888	8 18 16.8	4.70	1 18 10.4	22 52 38.75	0.867	8 16 52.7	4.57	
2		22 52 43.81	0.863	8 16 26.0	4.54	2 18 6.8	22 52 59.24	0.841	8 15 5.0	4.41	
3		22 53 4.19	0.837	8 14 39.0	4.38	3 18 3.2	22 53 19.11	0.815	8 13 21.1	4.25	
4		22 53 23.96	0.811	8 12 55.8	4.22	4 17 59.6	22 53 38.36	0.789	8 11 41.1	4.09	
5		22 53 43.11	0.785	8 11 16.5	4.06	5 17 56.0	22 53 56.99	0.763	8 10 5.0	3.93	
6		22 54 1.63	0.759	8 9 41.1	3.90	6 17 52.4	22 54 14.99	0.737	8 8 32.7	3.77	
7		22 54 19.52	0.732	8 8 9.6	3.73	7 17 48.8	22 54 32.36	0.710	8 7 4.4	3.60	
8		22 54 36.77	0.705	8 6 42.0	3.56	8 17 45.1	22 54 49.09	0.683	8 5 40.0	3.43	
9		22 54 53.37	0.678	8 5 18.5	3.39	9 17 41.4	22 55 5.16	0.656	8 4 19.7	3.26	
10		22 55 9.32	0.651	8 3 59.1	3.22	10 17 37.7	22 55 30.60	0.629	8 3 3.5	3.09	
11		22 55 24.61	0.623	8 2 43.7	3.05	11 17 34.0	22 55 35.37	0.601	8 1 51.3	2.92	
12		22 55 39.23	0.595	8 1 32.5	2.88	12 17 30.3	22 55 49.46	0.573	8 0 43.3	2.75	
13		22 55 53.18	0.567	8 0 25.4	2.71	13 17 26.6	22 56 2.88	0.545	7 59 39.4	2.58	
14		22 56 6.45	0.539	7 59 22.5	2.53	14 17 22.9	22 56 15.62	0.517	7 58 39.7	2.40	
15		22 56 19.04	0.511	7 58 23.9	2.35	15 17 19.1	22 56 27.68	0.489	7 57 44.3	2.22	
16		22 56 30.95	0.482	7 57 29.5	2.17	16 17 15.4	22 56 39.07	0.460	7 56 53.1	2.04	
17		22 56 42.17	0.453	7 56 39.4	1.99	17 17 11.6	22 56 49.77	0.431	7 56 6.3	1.86	
18		22 56 52.70	0.424	7 55 53.6	1.81	18 17 7.9	22 56 59.77	0.402	7 55 23.7	1.68	
19		22 57 2.53	0.395	7 55 12.2	1.63	19 17 4.1	22 57 9.08	0.373	7 54 45.5	1.50	
20		22 57 11.66	0.366	7 54 35.2	1.45	20 17 0.4	22 57 17.69	0.344	7 54 11.7	1.32	
21		22 57 20.08	0.337	7 54 2.6	1.27	21 16 56.6	22 57 25.59	0.315	7 53 42.2	1.14	
22		22 57 27.79	0.307	7 53 34.4	1.09	22 16 52.8	22 57 32.78	0.286	7 53 17.2	0.96	
23		22 57 34.80	0.277	7 53 10.6	0.90	23 16 49.0	22 57 39.27	0.257	7 52 56.6	0.78	
24		22 57 41.09	0.247	7 52 51.1	0.72	24 16 45.2	22 57 45.05	0.227	7 52 40.2	0.59	
25		22 57 46.67	0.217	7 52 36.1	0.53	25 16 41.3	22 57 50.12	0.197	7 52 28.3	0.40	
26		22 57 51.53	0.187	7 52 25.5	0.35	26 16 37.4	22 57 54.47	0.167	7 52 20.8	0.22	
27		22 57 55.68	0.157	7 52 19.3	+ 0.16	27 16 33.5	22 57 58.12	0.137	7 52 17.7	+0.04	
28		22 57 59.11	0.127	7 52 17.6	- 0.02	28 16 29.6	22 58 1.05	0.107	7 52 19.0	-0.14	
29		22 58 1.82	0.097	7 52 20.3	0.20	29 16 25.7	22 58 3.26	0.077	7 52 24.7	0.33	
30		22 58 3.81	0.067	7 52 27.4	0.39	30 16 21.8	22 58 4.76	0.047	7 52 34.8	0.51	
31		22 58 5.08	+0.037	-7 52 39.0	- 0.57	31 16 17.9	22 58 5.54	+0.017	-7 52 49.4	-0.70	

Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
July 1	22 58 5.08	+0.037	7 52 39.0	-0.57	1 16 17.9	22 58 5.54	+0.017	7 52 49.4	-0.70
2	22 58 5.63	+0.007	7 52 55.0	0.76	2 16 14.0	22 58 5.60	-0.013	7 53 8.4	0.88
3	22 58 5.46	-0.023	7 53 15.5	0.94	3 16 10.0	22 58 4.94	0.043	7 53 31.8	1.06
4	22 58 4.56	0.053	7 53 40.4	1.12	4 16 6.0	22 58 3.56	0.073	7 53 59.6	1.25
5	22 58 2.94	0.083	7 54 9.7	1.31	5 16 2.1	22 58 1.46	0.103	7 54 31.8	1.43
6	22 58 0.59	0.113	7 54 43.5	1.50	6 15 58.1	22 57 58.63	0.133	7 55 8.4	1.61
7	22 57 57.72	0.143	7 55 21.7	1.68	7 15 54.1	22 57 55.09	0.163	7 55 49.4	1.80
8	22 57 53.73	0.173	7 56 4.3	1.87	8 15 50.1	22 57 50.84	0.193	7 56 34.8	1.99
9	22 57 49.22	0.203	7 56 51.4	2.05	9 15 46.1	22 57 45.87	0.223	7 57 24.7	2.17
10	22 57 43.98	0.233	7 57 42.9	2.24	10 15 42.0	22 57 40.17	0.252	7 58 18.9	2.35
11	22 57 38.02	0.263	7 58 38.7	2.42	11 15 38.0	22 57 33.76	0.282	7 59 17.4	2.53
12	22 57 31.34	0.293	7 59 38.9	2.60	12 15 34.0	22 57 26.64	0.312	8 0 20.2	2.71
13	22 57 23.94	0.323	8 0 43.4	2.78	13 15 30.0	22 57 18.80	0.342	8 1 27.3	2.89
14	22 57 15.83	0.353	8 1 52.3	2.96	14 15 25.9	22 57 10.25	0.371	8 2 38.7	3.07
15	22 57 7.00	0.383	8 3 5.4	3.14	15 15 21.8	22 57 0.99	0.400	8 3 54.3	3.24
16	22 56 57.47	0.412	8 4 22.8	3.32	16 15 17.7	22 56 51.04	0.429	8 5 14.1	3.41
17	22 56 47.23	0.441	8 5 44.4	3.49	17 15 13.6	22 56 40.39	0.458	8 6 38.1	3.59
18	22 56 36.29	0.470	8 7 10.2	3.66	18 15 9.5	22 56 29.04	0.487	8 8 6.3	3.75
19	22 56 24.65	0.499	8 8 40.1	3.83	19 15 5.3	22 56 17.00	0.516	8 9 38.5	3.92
20	22 56 12.33	0.528	8 10 14.1	4.00	20 15 1.2	22 56 4.29	0.544	8 11 14.7	4.09
21	22 55 59.32	0.556	8 11 52.1	4.16	21 14 57.0	22 55 50.90	0.572	8 12 54.9	4.25
22	22 55 45.64	0.584	8 13 34.0	4.32	22 14 52.9	22 55 36.85	0.600	8 14 38.9	4.41
23	22 55 31.29	0.611	8 15 19.8	4.48	23 14 48.7	22 55 22.14	0.627	8 16 26.8	4.57
24	22 55 16.29	0.638	8 17 9.4	4.64	24 14 44.5	22 55 6.79	0.654	8 18 18.3	4.73
25	22 55 0.64	0.665	8 19 2.8	4.80	25 14 40.3	22 54 50.80	0.680	8 20 13.6	4.88
26	22 54 44.35	0.691	8 20 59.9	4.95	26 14 36.1	22 54 34.17	0.706	8 22 12.6	5.03
27	22 54 27.43	0.717	8 23 0.6	5.10	27 14 31.9	22 54 16.92	0.731	8 24 15.1	5.17
28	22 54 9.89	0.743	8 25 4.8	5.25	28 14 27.7	22 53 59.06	0.756	8 26 21.0	5.31
29	22 53 51.74	0.768	8 27 12.4	5.39	29 14 23.4	22 53 40.60	0.781	8 28 30.3	5.45
30	22 53 33.00	0.793	8 29 23.3	5.53	30 14 19.2	22 53 21.56	0.805	8 30 42.8	5.59
31	22 53 13.66	0.817	8 31 37.6	5.66	31 14 14.9	22 53 1.94	0.829	8 32 58.6	5.72
Aug. 1	22 52 53.75	0.841	8 33 55.1	5.79	1 14 10.6	22 52 41.76	0.852	8 35 17.5	5.85
2	22 52 33.27	0.864	8 36 15.7	5.92	2 14 6.3	22 52 21.02	0.875	8 37 39.5	5.98
3	22 52 12.24	0.887	8 38 39.4	6.05	3 14 2.0	22 51 59.74	0.898	8 40 4.5	6.10
4	22 51 50.67	0.910	8 41 6.0	6.17	4 13 57.7	22 51 37.92	0.920	8 42 32.3	6.22
5	22 51 28.57	0.932	8 43 35.5	6.29	5 13 53.4	22 51 15.58	0.941	8 45 3.0	6.33
6	22 51 5.95	0.953	8 46 7.8	6.40	6 13 49.1	22 50 52.74	0.962	8 47 36.4	6.44
7	22 50 42.83	0.974	8 48 42.8	6.51	7 13 44.8	22 50 29.41	0.982	8 50 12.4	6.55
8	22 50 19.22	0.994	8 51 20.4	6.62	8 13 40.5	22 50 5.60	1.002	8 52 51.0	6.65
9	22 49 55.14	1.013	8 54 0.4	6.72	9 13 36.2	22 49 41.33	1.021	8 55 31.9	6.75
10	22 49 30.60	1.032	8 56 42.8	6.81	10 13 31.9	22 49 16.61	1.039	8 58 15.1	6.84
11	22 49 5.61	1.050	8 59 27.4	6.90	11 13 27.5	22 48 51.46	1.056	9 1 0.3	6.93
12	22 48 40.20	1.067	9 2 14.2	6.99	12 13 23.1	22 48 25.90	1.073	9 3 47.7	7.01
13	22 48 14.38	1.084	9 5 3.0	7.07	13 13 18.8	22 47 59.94	1.089	9 6 37.0	7.09
14	22 47 48.16	1.100	9 7 53.7	7.15	14 13 14.4	22 47 33.59	1.105	9 9 28.2	7.17
15	22 47 21.57	1.115	9 10 46.3	7.22	15 13 10.0	22 47 6.89	1.120	9 12 21.2	7.24
16	22 46 54.62	1.129	9 13 40.5	7.29	16 13 5.6	22 46 39.84	1.134	9 15 15.8	7.30
17	22 46 27.34	1.143	9 16 36.2	7.35	17 13 1.2	22 46 12.47	1.147	9 18 11.8	7.36
18	22 45 59.75	1.156	9 19 33.2	7.40	18 12 56.8	22 45 44.80	1.159	9 21 9.0	7.41
19	22 45 31.87	1.168	9 22 31.4	7.45	19 12 52.4	22 45 16.85	1.170	9 24 7.2	7.45
20	22 45 3.71	1.179	9 25 30.7	7.49	20 12 48.0	22 44 48.64	1.180	9 27 6.4	7.49
21	22 44 35.30	1.189	9 28 31.0	7.53	21 12 43.6	22 44 20.20	1.189	9 30 6.6	7.52
22	22 44 6.67	1.198	9 31 32.1	7.56	22 12 39.2	22 43 51.55	1.198	9 33 7.5	7.55
23	22 43 37.83	1.206	9 34 33.8	7.58	23 12 34.8	22 43 22.70	1.206	9 36 8.9	7.57
24	22 43 8.80	1.213	9 37 36.1	7.60	24 12 30.4	22 42 53.67	1.213	9 39 10.9	7.59
25	22 42 39.61	1.219	9 40 38.8	7.61	25 12 26.0	22 42 24.49	1.219	9 42 13.2	7.60
26	22 42 10.27	1.224	9 43 41.8	7.62	26 12 21.6	22 41 55.17	1.224	9 45 15.7	7.60
27	22 41 40.81	1.229	9 46 44.8	7.63	27 12 17.2	22 41 25.75	1.228	9 48 18.2	7.60
28	22 41 11.25	1.233	9 49 47.9	7.63	28 12 12.7	22 40 56.24	1.231	9 51 20.7	7.60
29	22 40 41.61	1.236	9 52 50.9	7.62	29 12 8.3	22 40 26.66	1.234	9 54 23.0	7.59
30	22 40 11.91	1.238	9 55 53.6	7.61	30 12 3.9	22 39 57.03	1.235	9 57 24.9	7.57
31	22 39 42.18	-1.239	9 58 55.8	-7.59	31 11 59.4	22 39 27.38	-1.235	10 0 26.3	-7.55



Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1	h m s	° ' "	° ' "	° ' "	° ' "	d h m	h m s	° ' "	° ' "	° ' "
2	22 39 12.44	-1.239	10 1 57.6	-7.56	7.53	1 11 55.0	22 38 57.73	-1.235	10 3 27.3	-7.52
3	22 38 42.70	1.238	10 4 58.7	7.53	7.49	2 11 50.6	22 38 28.09	1.234	10 6 27.5	7.49
4	22 38 12.99	1.237	10 7 59.0	7.49	7.45	3 11 46.2	22 37 58.49	1.232	10 9 26.8	7.45
5	22 37 43.33	1.234	10 10 58.4	7.45	7.40	4 11 41.8	22 37 28.95	1.229	10 12 25.1	7.41
6	22 37 13.74	1.231	10 13 56.7	7.40	7.35	5 11 37.4	22 36 59.50	1.225	10 15 22.3	7.36
7	22 36 44.24	1.227	10 16 53.9	7.35	7.30	6 11 33.0	22 36 30.14	1.220	10 18 18.3	7.31
8	22 36 14.86	1.221	10 19 49.8	7.30	7.24	7 11 28.5	22 36 0.91	1.214	10 21 13.0	7.25
9	22 35 45.62	1.215	10 22 44.2	7.24	7.17	8 11 24.1	22 35 31.84	1.208	10 24 6.2	7.18
10	22 35 16.54	1.208	10 25 37.1	7.17	7.10	9 11 19.7	22 35 2.93	1.200	10 26 57.8	7.11
11	22 34 47.64	1.200	10 28 28.4	7.10	7.02	10 11 15.3	22 34 34.21	1.191	10 29 47.8	7.04
12	22 34 18.94	1.191	10 31 17.8	7.02	6.94	11 11 10.9	22 34 5.70	1.182	10 32 35.8	6.96
13	22 33 50.47	1.181	10 34 5.4	6.94	6.85	12 11 6.5	22 33 37.43	1.172	10 35 22.0	6.88
14	22 33 22.25	1.170	10 36 51.0	6.85	6.76	13 11 2.1	22 33 9.42	1.161	10 38 6.1	6.79
15	22 32 54.30	1.158	10 39 34.4	6.76	6.66	14 10 57.7	22 32 41.69	1.149	10 40 48.0	6.69
16	22 32 26.64	1.145	10 42 15.5	6.66	6.56	15 10 53.3	22 32 14.25	1.136	10 43 27.5	6.59
17	22 31 59.29	1.132	10 44 54.2	6.56	6.45	16 10 49.0	22 31 47.13	1.122	10 46 4.6	6.48
18	22 31 32.28	1.118	10 47 30.4	6.45	6.34	17 10 44.6	22 31 20.36	1.107	10 48 39.1	6.37
19	22 31 5.62	1.103	10 50 3.9	6.34	6.22	18 10 40.2	22 30 53.94	1.092	10 51 10.9	6.26
20	22 30 39.36	1.087	10 52 34.5	6.22	6.10	19 10 35.9	22 30 27.93	1.076	10 53 39.8	6.14
21	22 30 13.50	1.070	10 55 2.2	6.10	5.97	20 10 31.5	22 30 2.33	1.059	10 56 5.8	6.02
22	22 29 48.05	1.052	10 57 26.9	5.97	5.84	21 10 27.2	22 29 37.14	1.041	10 58 28.8	5.89
23	22 29 23.03	1.033	10 59 48.6	5.84	5.71	22 10 22.8	22 29 12.39	1.022	11 0 48.7	5.76
24	22 28 58.47	1.014	11 2 7.2	5.71	5.57	23 10 18.5	22 28 48.10	1.002	11 3 5.5	5.63
25	22 28 34.38	0.994	11 4 22.5	5.57	5.43	24 10 14.1	22 28 24.29	0.982	11 5 19.0	5.49
26	22 28 10.77	0.973	11 6 34.5	5.43	5.29	25 10 9.8	22 28 0.96	0.961	11 7 29.2	5.35
27	22 27 47.67	0.952	11 8 43.1	5.29	5.14	26 10 5.5	22 27 38.15	0.940	11 9 36.0	5.21
28	22 27 25.10	0.930	11 10 48.1	5.14	4.99	27 10 1.2	22 27 15.87	0.918	11 11 39.2	5.06
29	22 27 3.07	0.907	11 12 49.6	4.99	4.84	28 9 56.9	22 26 54.13	0.895	11 13 38.9	4.91
30	22 26 41.58	0.884	11 14 47.6	4.84	4.69	29 9 52.6	22 26 32.93	0.872	11 15 35.0	4.76
Oct. 1	22 26 20.65	0.860	11 16 41.9	4.69	4.53	30 9 48.3	22 26 12.29	0.848	11 17 27.5	4.61
2	22 26 0.29	0.836	11 18 32.5	4.53	4.37	1 9 44.0	22 25 52.23	0.823	11 19 16.3	4.45
3	22 25 40.52	0.811	11 20 19.4	4.37	4.21	2 9 39.8	22 25 32.76	0.798	11 21 1.3	4.29
4	22 25 21.36	0.786	11 22 2.4	4.21	4.05	3 9 35.6	22 25 13.90	0.773	11 22 42.4	4.13
5	22 25 2.81	0.760	11 23 41.5	4.05	3.88	4 9 31.4	22 24 55.65	0.747	11 24 19.6	3.97
6	22 24 44.89	0.733	11 25 16.6	3.88	3.71	5 9 27.2	22 24 38.03	0.721	11 25 52.8	3.80
7	22 24 27.61	0.706	11 26 47.7	3.71	3.54	6 9 23.0	22 24 21.05	0.694	11 27 22.1	3.63
8	22 24 10.98	0.679	11 28 14.7	3.54	3.37	7 9 18.8	22 24 4.72	0.667	11 28 47.3	3.46
9	22 23 55.01	0.651	11 29 37.6	3.37	3.19	8 9 14.6	22 23 49.05	0.639	11 30 8.3	3.29
10	22 23 39.71	0.623	11 30 56.3	3.19	3.01	9 9 10.4	22 23 34.06	0.611	11 31 25.2	3.12
11	22 23 25.09	0.594	11 32 10.9	3.01	2.83	10 9 6.2	22 23 19.75	0.582	11 32 38.0	2.94
12	22 23 11.17	0.565	11 33 21.2	2.83	2.65	11 9 2.0	22 23 6.13	0.553	11 33 46.5	2.76
13	22 22 57.96	0.536	11 34 27.2	2.65	2.47	12 8 57.8	22 22 53.22	0.523	11 34 50.7	2.58
14	22 22 45.46	0.506	11 35 28.8	2.47	2.29	13 8 53.7	22 22 41.02	0.493	11 35 50.5	2.40
15	22 22 33.69	0.476	11 36 26.0	2.29	2.11	14 8 49.6	22 22 29.55	0.463	11 36 45.9	2.22
16	22 22 22.65	0.446	11 37 18.8	2.11	1.93	15 8 45.5	22 22 18.81	0.433	11 37 36.9	2.04
17	22 22 12.34	0.415	11 38 7.2	1.93	1.74	16 8 41.4	22 22 8.80	0.402	11 38 23.6	1.86
18	22 22 2.77	0.384	11 38 51.1	1.74	1.55	17 8 37.3	22 21 59.53	0.371	11 39 5.8	1.67
19	22 21 53.95	0.352	11 39 30.6	1.55	1.37	18 8 33.2	22 21 51.00	0.340	11 39 43.6	1.48
20	22 21 45.89	0.320	11 40 5.5	1.37	1.18	19 8 29.1	22 21 43.23	0.309	11 40 16.8	1.30
21	22 21 38.59	0.288	11 40 35.9	1.18	0.99	20 8 25.0	22 21 36.22	0.277	11 40 45.5	1.11
22	22 21 32.05	0.256	11 41 1.8	0.99	0.80	21 8 21.0	22 21 29.96	0.245	11 41 9.7	0.92
23	22 21 26.29	0.224	11 41 23.2	0.80	0.61	22 8 17.0	22 21 24.48	0.213	11 41 29.5	0.73
24	22 21 21.29	0.192	11 41 40.1	0.61	0.42	23 8 13.0	22 21 19.76	0.181	11 41 44.8	0.54
25	22 21 17.06	0.160	11 41 52.4	0.42	0.23	24 8 9.0	22 21 15.80	0.149	11 41 55.5	0.35
26	22 21 13.61	0.128	11 42 0.2	0.23	-0.04	25 8 5.0	22 21 12.62	0.117	11 42 1.7	-0.16
27	22 21 10.94	0.096	11 42 3.5	-0.04	+0.15	26 8 1.0	22 21 10.22	0.085	11 42 3.6	+0.02
28	22 21 9.03	0.064	11 42 2.3	+0.15	0.33	27 7 57.1	22 21 8.57	0.053	11 42 0.9	0.21
29	22 21 7.90	-0.031	11 41 56.6	0.33	0.52	28 7 53.1	22 21 7.69	-0.021	11 41 53.8	0.39
30	22 21 7.54	+0.001	11 41 46.4	0.52	0.71	29 7 49.2	22 21 7.58	+0.012	11 41 42.2	0.58
31	22 21 7.95	0.033	11 41 31.9	0.71	+0.90	30 7 45.2	22 21 8.24	0.044	11 41 26.3	0.77
	22 21 9.13	+0.065	11 41 12.9	+0.90		31 7 41.3	22 21 9.67	+0.076	11 41 5.9	+0.95

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
		Apparent Right Ascension.	Diff for 1 hour.	Apparent Declination.	Diff for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
1879.		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>+</sup> <sup>+</sup> <sup>+</sup>	<sup>°</sup> <sup>'</sup> <sup>''</sup>	<sup>+</sup> <sup>+</sup> <sup>+</sup>	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>+</sup> <sup>+</sup> <sup>+</sup>	<sup>°</sup> <sup>'</sup> <sup>''</sup>	<sup>+</sup> <sup>+</sup> <sup>+</sup>
Nov.	1	22 21 11.09	+0.098	-11 40 49.4	+ 1.08	1 7 37.4	22 21 11.87	+0.108	-11 40 41.0	+ 1.13
	2	22 21 13.82	0.130	11 40 21.4	1.26	2 7 33.5	22 21 14.84	0.140	11 40 11.7	1.31
	3	22 21 17.32	0.162	11 39 48.9	1.45	3 7 29.6	22 21 18.57	0.172	11 39 37.9	1.50
	4	22 21 21.59	0.194	11 39 12.0	1.64	4 7 25.7	22 21 23.07	0.204	11 38 59.7	1.63
	5	22 21 26.63	0.226	11 38 30.7	1.82	5 7 21.9	22 21 28.33	0.236	11 38 17.2	1.87
	6	22 21 32.44	0.258	11 37 45.0	2.00	6 7 18.1	22 21 34.36	0.268	11 37 30.3	2.05
	7	22 21 39.02	0.290	11 36 54.9	2.18	7 7 14.3	22 21 41.15	0.300	11 36 39.0	2.23
	8	22 21 46.36	0.322	11 36 0.4	2.37	8 7 10.5	22 21 48.70	0.331	11 35 43.3	2.42
	9	22 21 54.46	0.354	11 35 1.5	2.55	9 7 6.7	22 21 57.00	0.362	11 34 43.3	2.60
	10	22 22 3.32	0.386	11 33 58.2	2.73	10 7 3.0	22 22 6.06	0.393	11 33 38.9	2.78
	11	22 22 12.93	0.417	11 32 50.5	2.91	11 6 59.2	22 22 15.86	0.424	11 32 30.1	2.96
	12	22 22 23.30	0.448	11 31 38.4	3.09	12 6 55.5	22 22 26.42	0.455	11 31 16.9	3.14
	13	22 22 34.42	0.479	11 30 22.1	3.27	13 6 51.7	22 22 37.72	0.486	11 29 59.6	3.32
	14	22 22 46.28	0.510	11 29 1.5	3.45	14 6 48.0	22 22 49.76	0.517	11 28 38.0	3.50
	15	22 22 58.89	0.541	11 27 36.7	3.63	15 6 44.3	22 23 2.55	0.548	11 27 12.2	3.67
	16	22 23 12.23	0.571	11 26 7.6	3.81	16 6 40.6	22 23 16.06	0.578	11 25 42.1	3.84
	17	22 23 26.30	0.601	11 24 34.3	3.98	17 6 36.9	22 23 30.29	0.608	11 24 7.9	4.01
	18	22 23 41.09	0.631	11 22 56.8	4.15	18 6 33.2	22 23 45.24	0.638	11 22 29.5	4.18
	19	22 23 56.61	0.661	11 21 15.1	4.33	19 6 29.5	22 24 0.92	0.668	11 20 46.9	4.35
	20	22 24 12.85	0.691	11 19 29.2	4.49	20 6 25.9	22 24 17.31	0.697	11 19 0.2	4.52
	21	22 24 29.79	0.720	11 17 39.3	4.66	21 6 22.2	22 24 34.39	0.726	11 17 9.5	4.69
	22	22 24 47.43	0.749	11 15 45.4	4.83	22 6 18.6	22 24 52.17	0.755	11 15 14.8	4.86
	23	22 25 5.75	0.778	11 13 47.5	5.00	23 6 15.0	22 25 10.63	0.783	11 13 16.2	5.03
	24	22 25 24.77	0.807	11 11 45.6	5.17	24 6 11.4	22 25 29.78	0.811	11 11 13.6	5.19
	25	22 25 44.47	0.835	11 9 39.8	5.33	25 6 7.8	22 25 49.60	0.839	11 9 7.1	5.35
	26	22 26 4.85	0.863	11 7 30.1	5.49	26 6 4.2	22 26 10.10	0.867	11 6 56.7	5.51
	27	22 26 25.90	0.891	11 5 16.5	5.65	27 6 0.6	22 26 31.26	0.895	11 4 42.5	5.67
	28	22 26 47.60	0.918	11 2 59.0	5.81	28 5 57.0	22 26 53.07	0.922	11 2 24.4	5.83
	29	22 27 9.95	0.945	11 0 37.7	5.97	29 5 53.4	22 27 15.52	0.949	11 0 2.5	5.99
	30	22 27 32.95	0.972	10 58 12.6	6.13	30 5 49.8	22 27 38.62	0.976	10 57 36.8	6.15
Dec.	1	22 27 56.59	0.998	10 55 43.7	6.29	1 5 46.3	22 28 2.26	1.002	10 55 7.4	6.31
	2	22 28 20.85	1.024	10 53 11.1	6.44	2 5 42.8	22 28 26.71	1.028	10 52 34.3	6.46
	3	22 28 45.74	1.050	10 50 34.8	6.59	3 5 39.3	22 28 51.69	1.054	10 49 57.5	6.61
	4	22 29 11.24	1.076	10 47 54.9	6.74	4 5 35.8	22 29 17.27	1.079	10 47 17.1	6.76
	5	22 29 37.35	1.101	10 45 11.4	6.89	5 5 32.3	22 29 43.46	1.104	10 44 33.2	6.91
	6	22 30 4.07	1.126	10 42 24.3	7.04	6 5 28.8	22 30 10.25	1.129	10 41 45.7	7.06
	7	22 30 31.40	1.151	10 39 33.6	7.19	7 5 25.3	22 30 37.63	1.154	10 38 54.6	7.20
	8	22 30 59.32	1.176	10 36 39.3	7.34	8 5 21.8	22 31 5.63	1.178	10 35 59.9	7.35
	9	22 31 27.83	1.200	10 33 41.4	7.49	9 5 18.4	22 31 34.20	1.202	10 33 1.6	7.50
	10	22 31 56.92	1.224	10 30 40.1	7.63	10 5 15.0	22 32 3.35	1.226	10 30 0.0	7.64
	11	22 32 26.58	1.248	10 27 35.3	7.77	11 5 11.5	22 32 33.06	1.250	10 26 54.9	7.78
	12	22 32 56.80	1.271	10 24 27.1	7.91	12 5 8.1	22 33 3.33	1.273	10 23 46.4	7.92
	13	22 33 27.58	1.294	10 21 15.5	8.05	13 5 4.7	22 33 34.15	1.296	10 20 34.5	8.06
	14	22 33 58.91	1.317	10 18 0.6	8.19	14 5 1.3	22 34 5.52	1.319	10 17 19.4	8.20
	15	22 34 30.79	1.339	10 14 42.3	8.33	15 4 57.9	22 34 37.44	1.341	10 14 0.9	8.34
	16	22 35 3.20	1.361	10 11 20.7	8.47	16 4 54.5	22 35 9.88	1.363	10 10 39.1	8.48
	17	22 35 36.14	1.383	10 7 55.9	8.60	17 4 51.1	22 35 42.85	1.385	10 7 14.1	8.61
	18	22 36 9.60	1.404	10 4 27.9	8.73	18 4 47.8	22 36 16.34	1.406	10 3 46.0	8.74
	19	22 36 43.57	1.425	10 0 56.8	8.86	19 4 44.4	22 36 50.33	1.427	10 0 14.8	8.87
	20	22 37 18.03	1.446	9 57 22.6	8.99	20 4 41.0	22 37 24.81	1.447	9 56 40.5	9.00
	21	22 37 52.99	1.467	9 53 45.3	9.12	21 4 37.6	22 37 59.78	1.467	9 53 3.1	9.13
	22	22 38 28.43	1.487	9 50 4.9	9.24	22 4 34.3	22 38 35.23	1.487	9 49 22.6	9.25
	23	22 39 4.35	1.507	9 46 21.6	9.37	23 4 30.9	22 39 11.16	1.506	9 45 39.3	9.37
	24	22 39 40.74	1.526	9 42 35.4	9.49	24 4 27.6	22 39 47.55	1.525	9 41 53.1	9.49
	25	22 40 17.59	1.545	9 38 46.2	9.61	25 4 24.3	22 40 24.41	1.544	9 38 3.9	9.61
	26	22 40 54.90	1.564	9 34 54.2	9.73	26 4 21.0	22 41 1.72	1.563	9 34 11.9	9.73
	27	22 41 32.65	1.582	9 30 59.3	9.85	27 4 17.7	22 41 39.46	1.582	9 30 17.0	9.84
	28	22 42 10.84	1.600	9 27 1.6	9.97	28 4 14.4	22 42 17.64	1.600	9 26 19.4	9.96
	29	22 42 49.47	1.618	9 23 1.2	10.08	29 4 11.1	22 42 56.25	1.618	9 22 19.0	10.08
	30	22 43 28.52	1.636	9 18 58.0	10.19	30 4 7.8	22 43 35.28	1.635	9 18 15.9	10.19
	31	22 44 7.99	1.653	9 14 52.1	10.30	31 4 4.5	22 44 14.73	1.652	9 14 10.1	10.30
	32	22 44 47.86	+1.670	-9 10 43.5	+10.41	32 4 1.2	22 44 54.58	+1.669	-9 10 1.6	+10.41

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Jan.	1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"
	2	23 53 5.27	+0.514	-3 15' 4.7	+3.90	1 5 8.4	23 53 7.92	+0.516	-3 14' 44.6	+3.91
	3	23 53 17.78	0.529	3 13 30.0	3.99	2 5 4.7	23 53 20.47	0.530	3 13 9.7	4.00
	4	23 53 30.64	0.543	3 11 53.2	4.08	3 5 1.0	23 53 33.37	0.544	3 11 32.7	4.08
	5	23 53 43.84	0.557	3 10 14.3	4.17	4 4 57.2	23 53 46.61	0.558	3 9 53.6	4.17
	6	23 53 57.37	0.571	3 8 33.3	4.25	5 4 53.5	23 54 0.17	0.572	3 8 12.5	4.25
	7	23 54 11.24	0.585	3 6 50.3	4.34	6 4 49.8	23 54 14.07	0.586	3 6 29.3	4.34
	8	23 54 25.44	0.598	3 5 5.3	4.42	7 4 46.1	23 54 28.30	0.599	3 4 44.2	4.42
	9	23 54 39.96	0.612	3 3 18.3	4.50	8 4 42.4	23 54 42.85	0.613	3 2 57.1	4.50
	10	23 54 54.80	0.625	3 1 29.3	4.58	9 4 38.7	23 54 57.71	0.626	3 1 8.0	4.58
	11	23 55 9.96	0.638	2 59 38.3	4.66	10 4 35.1	23 55 12.89	0.639	2 59 17.0	4.66
	12	23 55 25.43	0.651	2 57 45.4	4.74	11 4 31.4	23 55 28.37	0.652	2 57 24.0	4.74
	13	23 55 41.22	0.664	2 55 50.6	4.82	12 4 27.7	23 55 44.18	0.665	2 55 29.2	4.82
	14	23 55 57.32	0.677	2 53 53.9	4.90	13 4 24.1	23 56 0.29	0.678	2 53 32.4	4.90
	15	23 56 13.72	0.690	2 51 55.4	4.98	14 4 20.4	23 56 16.71	0.691	2 51 33.9	4.98
	16	23 56 30.43	0.702	2 49 55.0	5.05	15 4 16.8	23 56 33.43	0.703	2 49 33.5	5.05
	17	23 56 47.43	0.715	2 47 52.8	5.13	16 4 13.1	23 56 50.45	0.715	2 47 31.2	5.13
	18	23 57 4.73	0.727	2 45 48.8	5.20	17 4 9.5	23 57 7.76	0.727	2 45 27.2	5.20
	19	23 57 22.32	0.740	2 43 43.1	5.28	18 4 5.8	23 57 25.36	0.740	2 43 21.5	5.28
	20	23 57 40.20	0.752	2 41 35.7	5.35	19 4 2.2	23 57 43.24	0.752	2 41 14.1	5.35
	21	23 57 58.37	0.763	2 39 26.5	5.42	20 3 58.6	23 58 1.41	0.763	2 39 5.0	5.42
	22	23 58 16.82	0.774	2 37 15.6	5.49	21 3 54.9	23 58 19.85	0.774	2 36 54.1	5.49
	23	23 58 35.54	0.786	2 35 3.1	5.56	22 3 51.3	23 58 38.37	0.786	2 34 41.7	5.56
	24	23 58 54.54	0.797	2 32 49.0	5.62	23 3 47.7	23 58 57.56	0.797	2 32 27.7	5.62
	25	23 59 13.80	0.808	2 30 33.3	5.69	24 3 44.1	23 59 16.82	0.808	2 30 12.1	5.68
	26	23 59 33.33	0.819	2 28 16.0	5.75	25 3 40.5	23 59 36.34	0.819	2 27 54.9	5.75
	27	23 59 53.11	0.830	2 25 57.2	5.82	26 3 36.9	23 59 56.11	0.830	2 25 36.2	5.81
	28	0 0 13.14	0.840	2 23 36.9	5.88	27 3 33.3	0 0 16.13	0.840	2 23 16.0	5.87
	29	0 0 33.43	0.851	2 21 15.1	5.94	28 3 29.7	0 0 36.40	0.850	2 20 54.3	5.93
	30	0 0 53.96	0.861	2 18 51.9	6.00	29 3 26.1	0 0 56.92	0.860	2 18 31.3	5.99
	31	0 1 14.74	0.871	2 16 27.3	6.06	30 3 22.5	0 1 17.68	0.869	2 16 6.8	6.05
Feb.	1	0 1 35.75	0.880	2 14 1.4	6.11	31 3 18.9	0 1 38.67	0.879	2 13 41.1	6.10
	2	0 1 56.99	0.890	2 11 34.1	6.17	1 3 15.3	0 1 59.89	0.889	2 11 14.0	6.16
	3	0 2 18.46	0.899	2 9 5.5	6.22	2 3 11.8	0 2 21.34	0.898	2 8 45.6	6.21
	4	0 2 40.16	0.908	2 6 35.6	6.27	3 3 8.2	0 2 43.01	0.907	2 6 15.9	6.26
	5	0 3 2.07	0.917	2 4 4.5	6.32	4 3 4.6	0 3 4.89	0.916	2 3 45.0	6.31
	6	0 3 24.20	0.926	2 1 32.2	6.37	5 3 1.1	0 3 26.99	0.925	2 1 13.0	6.36
	7	0 3 46.54	0.935	1 58 58.7	6.42	6 2 57.5	0 3 49.30	0.934	1 58 39.7	6.41
	8	0 4 9.08	0.944	1 56 24.0	6.47	7 2 53.9	0 4 11.81	0.943	1 56 5.2	6.46
	9	0 4 31.83	0.952	1 53 48.2	6.52	8 2 50.4	0 4 34.53	0.951	1 53 29.7	6.50
	10	0 4 54.78	0.960	1 51 11.2	6.57	9 2 46.8	0 4 57.45	0.959	1 50 52.9	6.55
	11	0 5 17.92	0.968	1 48 33.2	6.61	10 2 43.3	0 5 20.56	0.967	1 48 15.2	6.59
	12	0 5 41.25	0.976	1 45 54.1	6.65	11 2 39.7	0 5 43.85	0.975	1 45 36.4	6.64
	13	0 6 4.77	0.984	1 43 14.0	6.69	12 2 36.2	0 6 7.33	0.983	1 42 56.6	6.68
	14	0 6 28.48	0.992	1 40 32.8	6.73	13 2 32.7	0 6 31.00	0.990	1 40 15.7	6.72
	15	0 6 52.37	0.999	1 37 50.7	6.77	14 2 29.1	0 6 54.85	0.997	1 37 33.9	6.76
	16	0 7 16.43	1.006	1 35 7.6	6.81	15 2 25.6	0 7 18.87	1.004	1 34 51.1	6.80
	17	0 7 40.66	1.013	1 32 23.6	6.85	16 2 22.1	0 7 43.06	1.011	1 32 7.4	6.84
	18	0 8 5.06	1.020	1 29 38.6	6.89	17 2 18.5	0 8 7.41	1.018	1 29 22.7	6.88
	19	0 8 29.62	1.027	1 26 52.8	6.92	18 2 15.0	0 8 31.93	1.025	1 26 37.2	6.91
	20	0 8 54.34	1.034	1 24 6.2	6.96	19 2 11.5	0 8 56.60	1.032	1 23 50.9	6.95
	21	0 9 19.21	1.040	1 21 18.8	6.99	20 2 8.0	0 9 21.43	1.038	1 21 3.9	6.98
	22	0 9 44.24	1.046	1 18 30.6	7.02	21 2 4.5	0 9 46.41	1.044	1 18 16.0	7.01
	23	0 10 9.41	1.052	1 15 41.7	7.05	22 2 1.0	0 10 11.53	1.050	1 15 27.5	7.04
	24	0 10 34.72	1.058	1 12 52.1	7.08	23 1 57.4	0 10 36.79	1.056	1 12 38.2	7.07
	25	0 11 0.17	1.063	1 10 1.9	7.11	24 1 53.9	0 11 2.19	1.061	1 9 48.4	7.09
	26	0 11 25.74	1.068	1 7 11.0	7.14	25 1 50.4	0 11 27.70	1.066	1 6 57.9	7.12
	27	0 11 51.44	1.073	1 4 19.5	7.16	26 1 46.9	0 11 53.35	1.071	1 4 6.7	7.14
	28	0 12 17.26	1.078	1 1 27.4	7.18	27 1 43.4	0 12 19.12	1.076	1 1 15.0	7.17
	29	0 12 43.20	1.083	0 58 34.8	7.20	28 1 39.9	0 12 45.01	1.081	0 58 22.8	7.19
	30	0 13 9.25	+1.088	-0 55 41.6	+7.22	29 1 36.4	0 13 11.00	+1.085	-0 55 30.0	+7.21

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Mar.	1	<sup>h</sup> 0 <sup>m</sup> 13 <sup>s</sup> 9.25	+1.088	0 55' 41".6	+7".22	<sup>d</sup> 1 <sup>h</sup> 1 <sup>m</sup> 36.4	<sup>h</sup> 0 <sup>m</sup> 13 <sup>s</sup> 11.00	+1.085	0 55' 30".0	+7".21
	2	0 13 35.41	1.092	0 52 48.0	7.24	2 1 32.9	0 13 37.11	1.089	0 52 36.8	7.23
	3	0 14 1.68	1.096	0 49 53.9	7.26	3 1 29.4	0 14 3.32	1.093	0 49 43.1	7.25
	4	0 14 28.04	1.100	0 46 59.4	7.28	4 1 25.9	0 14 29.62	1.096	0 46 49.0	7.26
	5	0 14 54.50	1.104	0 44 4.4	7.30	5 1 22.4	0 14 56.02	1.100	0 43 54.4	7.28
	6	0 15 21.05	1.108	0 41 9.1	7.31	6 1 18.9	0 15 22.51	1.104	0 40 59.5	7.30
	7	0 15 47.69	1.112	0 38 13.5	7.33	7 1 15.4	0 15 49.09	1.108	0 38 4.3	7.31
	8	0 16 14.41	1.115	0 35 17.5	7.34	8 1 11.9	0 16 15.75	1.112	0 35 8.7	7.33
	9	0 16 41.21	1.118	0 32 21.2	7.35	9 1 8.5	0 16 42.49	1.116	0 32 12.8	7.34
	10	0 17 8.09	1.121	0 29 24.6	7.36	10 1 5.0	0 17 9.31	1.119	0 29 16.6	7.35
	11	0 17 35.04	1.124	0 26 27.8	7.37	11 1 1.5	0 17 36.19	1.122	0 26 20.2	7.36
	12	0 18 2.06	1.127	0 23 30.8	7.38	12 0 58.0	0 18 3.15	1.125	0 23 23.7	7.36
	13	0 18 29.15	1.130	0 20 33.6	7.39	13 0 54.5	0 18 30.18	1.127	0 20 26.9	7.37
	14	0 18 56.30	1.132	0 17 36.2	7.40	14 0 51.0	0 18 57.26	1.130	0 17 29.9	7.37
	15	0 19 23.50	1.135	0 14 38.6	7.40	15 0 47.6	0 19 24.40	1.132	0 14 32.8	7.38
	16	0 19 50.76	1.137	0 11 40.9	7.40	16 0 44.1	0 19 51.59	1.134	0 11 35.5	7.38
	17	0 20 18.06	1.139	0 8 43.2	7.41	17 0 40.6	0 20 18.83	1.136	0 8 38.2	7.39
	18	0 20 45.41	1.140	0 5 45.4	7.41	18 0 37.1	0 20 46.11	1.138	0 5 40.8	7.39
	19	0 21 12.80	1.142	0 2 47.6	7.41	19 0 33.6	0 21 13.44	1.140	0 2 43.5	7.39
	20	0 21 40.23	1.144	+0 0 10.2	7.41	20 0 30.2	0 21 40.80	1.141	+0 0 13.9	7.39
	21	0 22 7.69	1.145	0 3 8.0	7.40	21 0 26.7	0 22 8.20	1.142	0 3 11.3	7.39
	22	0 22 35.18	1.146	0 6 5.7	7.40	22 0 23.2	0 22 35.62	1.143	0 6 8.6	7.39
	23	0 23 2.69	1.147	0 9 3.3	7.39	23 0 19.7	0 23 3.07	1.144	0 9 5.7	7.38
	24	0 23 30.22	1.147	0 12 0.8	7.39	24 0 16.3	0 23 30.53	1.144	0 12 2.8	7.38
	25	0 23 57.76	1.148	0 14 58.2	7.38	25 0 12.8	0 23 58.00	1.145	0 14 59.8	7.37
	26	0 24 25.32	1.148	0 17 55.4	7.38	26 0 9.3	0 24 25.50	1.145	0 17 56.6	7.36
	27	0 24 52.88	1.148	0 20 52.3	7.37	27 0 5.8	0 24 52.99	1.145	0 20 53.0	7.34
	28	0 25 20.44	1.148	0 23 49.0	7.36	28 0 2.4	0 25 20.49	1.145	0 23 49.3	7.33
	29	0 25 48.00	1.148	0 26 45.4	7.35	29 23 58.9	0 25 47.98	1.145	0 26 45.2	7.32
	30	0 26 15.55	1.147	0 29 41.5	7.33	30 23 51.9	0 26 42.93	1.144	0 29 40.9	7.31
	31	0 26 43.08	1.147	0 32 37.3	7.32	31 23 48.4	0 27 10.38	1.144	0 32 36.3	7.30
Apr.	1	0 27 10.60	1.146	0 35 32.8	7.30	1 23 45.0	0 27 37.82	1.143	0 35 31.4	7.28
	2	0 27 38.10	1.146	0 38 27.9	7.28	2 23 41.5	0 27 5.23	1.142	0 38 26.1	7.27
	3	0 28 5.58	1.145	0 41 22.6	7.27	3 23 38.0	0 28 32.63	1.141	0 41 20.4	7.25
	4	0 28 33.04	1.144	0 44 16.9	7.25	4 23 34.6	0 28 59.99	1.140	0 44 14.3	7.24
	5	0 29 0.47	1.142	0 47 10.7	7.23	5 23 31.1	0 29 27.32	1.138	0 47 7.6	7.22
	6	0 29 27.86	1.141	0 50 4.1	7.21	6 23 27.6	0 29 27.32	1.138	0 50 0.6	7.20
	7	0 29 55.21	1.139	0 52 57.0	7.19	7 23 24.1	0 29 54.60	1.136	0 52 53.1	7.18
	8	0 30 22.52	1.138	0 55 49.3	7.17	8 23 20.6	0 30 21.85	1.134	0 55 45.0	7.16
	9	0 30 49.79	1.136	0 58 41.1	7.15	9 23 17.2	0 30 49.05	1.132	0 58 36.4	7.13
	10	0 31 17.01	1.134	1 1 32.4	7.13	10 23 13.7	0 31 16.20	1.130	1 1 27.3	7.11
	11	0 31 44.18	1.131	1 4 23.1	7.10	11 23 10.2	0 31 43.31	1.128	1 4 17.6	7.08
	12	0 32 11.30	1.129	1 7 13.2	7.08	12 23 6.7	0 32 10.36	1.126	1 7 7.3	7.06
	13	0 32 38.36	1.126	1 10 2.7	7.05	13 23 3.2	0 32 37.36	1.123	1 9 56.5	7.03
	14	0 33 5.35	1.123	1 12 51.5	7.02	14 23 3.2	0 33 4.28	1.121	1 12 44.9	7.00
	15	0 33 32.28	1.120	1 15 39.6	6.99	15 23 59.7	0 33 31.15	1.118	1 15 32.6	6.97
	16	0 33 59.13	1.117	1 18 26.9	6.96	16 23 56.3	0 33 57.94	1.115	1 18 19.5	6.94
	17	0 34 25.90	1.114	1 21 13.5	6.93	17 23 52.8	0 34 24.65	1.112	1 21 5.7	6.91
	18	0 34 52.60	1.111	1 23 59.4	6.90	18 23 49.3	0 34 51.29	1.108	1 23 51.3	6.88
	19	0 35 19.21	1.107	1 26 44.5	6.86	19 23 45.8	0 35 17.84	1.105	1 26 36.0	6.85
	20	0 35 45.74	1.104	1 29 28.7	6.83	20 23 42.3	0 35 44.31	1.101	1 29 19.8	6.81
	21	0 36 12.18	1.100	1 32 12.1	6.79	21 23 38.8	0 36 10.69	1.097	1 32 2.9	6.78
	22	0 36 39.52	1.096	1 34 54.6	6.75	22 23 35.3	0 36 36.98	1.093	1 34 45.0	6.74
	23	0 37 4.76	1.091	1 37 36.2	6.71	22 23 31.8	0 37 3.16	1.089	1 37 26.3	6.70
	24	0 37 30.89	1.087	1 40 16.8	6.67	23 23 28.3	0 37 29.23	1.084	1 40 6.6	6.66
	25	0 37 56.91	1.082	1 42 56.5	6.63	24 23 24.8	0 37 55.20	1.080	1 42 45.9	6.62
	26	0 38 22.82	1.077	1 45 35.2	6.59	25 23 21.3	0 38 21.05	1.075	1 45 24.3	6.58
	27	0 38 49.61	1.072	1 48 12.9	6.55	26 23 17.8	0 38 46.78	1.070	1 48 1.7	6.54
	28	0 39 14.27	1.067	1 50 49.6	6.51	27 23 14.3	0 39 12.39	1.065	1 50 38.1	6.50
	29	0 39 39.81	1.062	1 53 25.2	6.46	28 23 10.8	0 39 37.87	1.059	1 53 13.4	6.45
	30	0 40 5.23	1.057	1 55 59.8	6.42	29 23 7.3	0 40 3.24	1.054	1 55 47.8	6.41
	31	0 40 30.52	+1.051	+1 58 33.3	+6.37	30 23 3.8	0 40 28.48	1.048	1 58 21.0	6.36
					31 23 0.3	0 40 53.58	+1.043	+2 0 53.0	+6.31	

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT,					
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
May	1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"	
	1	0 40 30.52	+1.051	+1 58 33.3	+6.37	1 22 0.3	0 40 53.58	+1.043	+2 0 53.0	+6.31	
	2	0 40 55.67	1.045	2 1 5.6	6.32	2 21 56.7	0 41 18.54	1.037	2 3 24.0	6.26	
	3	0 41 20.68	1.039	2 3 36.8	6.27	3 21 53.2	0 41 43.37	1.031	2 5 53.7	6.21	
	4	0 41 45.55	1.033	2 6 6.8	6.23	4 21 49.7	0 42 8.04	1.025	2 8 22.3	6.16	
	5	0 42 10.27	1.027	2 8 35.7	6.18	5 21 46.2	0 42 32.58	1.019	2 10 49.8	6.11	
	6	0 42 34.85	1.021	2 11 3.4	6.13	6 21 42.7	0 42 56.95	1.012	2 13 16.0	6.06	
	7	0 42 59.27	1.014	2 13 29.9	6.08	7 21 39.1	0 43 21.17	1.006	2 15 41.0	6.01	
	8	0 43 23.53	1.008	2 15 55.1	6.03	8 21 35.6	0 43 45.23	0.999	2 18 4.6	5.96	
	9	0 43 47.64	1.001	2 18 19.0	5.97	9 21 32.1	0 44 9.13	0.992	2 20 27.1	5.91	
	10	0 44 11.58	0.994	2 20 41.7	5.92	10 21 28.5	0 44 32.87	0.985	2 22 48.2	5.85	
	11	0 44 35.36	0.987	2 23 3.0	5.86	11 21 25.0	0 44 56.43	0.978	2 25 8.0	5.80	
	12	0 44 58.96	0.980	2 25 23.0	5.81	12 21 21.4	0 45 19.82	0.971	2 27 26.5	5.74	
	13	0 45 22.39	0.972	2 27 41.7	5.75	13 21 17.9	0 45 43.03	0.963	2 29 43.6	5.68	
	14	0 45 45.64	0.965	2 29 59.0	5.69	14 21 14.3	0 46 6.07	0.956	2 31 59.3	5.62	
	15	0 46 8.71	0.957	2 32 14.9	5.63	15 21 10.8	0 46 28.91	0.948	2 34 13.6	5.56	
	16	0 46 31.59	0.949	2 34 29.3	5.57	16 21 7.2	0 46 51.57	0.940	2 36 26.4	5.50	
	17	0 46 54.28	0.941	2 36 42.3	5.51	17 21 3.7	0 47 14.03	0.932	2 38 37.8	5.44	
	18	0 47 16.77	0.933	2 38 53.8	5.45	18 21 0.1	0 47 36.30	0.924	2 40 47.6	5.38	
	19	0 47 39.07	0.925	2 41 3.8	5.39	19 20 56.6	0 47 58.36	0.915	2 42 56.0	5.32	
	20	0 48 1.16	0.916	2 43 12.3	5.33	20 20 53.0	0 48 20.21	0.906	2 45 2.8	5.26	
	21	0 48 23.04	0.907	2 45 19.2	5.26	21 20 49.4	0 48 41.66	0.897	2 47 8.1	5.19	
	22	0 48 44.71	0.899	2 47 24.6	5.19	22 20 45.8	0 49 3.29	0.888	2 49 11.8	5.12	
	23	0 49 6.17	0.890	2 49 28.4	5.12	23 20 42.2	0 49 24.51	0.879	2 51 13.8	5.05	
	24	0 49 27.41	0.881	2 51 30.5	5.06	24 20 38.7	0 49 45.50	0.870	2 53 14.2	4.98	
	25	0 49 48.42	0.871	2 53 31.0	4.99	25 20 35.1	0 50 6.27	0.860	2 55 13.1	4.91	
	26	0 50 9.21	0.862	2 55 29.9	4.92	26 20 31.5	0 50 26.81	0.851	2 57 10.3	4.84	
	27	0 50 29.77	0.852	2 57 27.1	4.85	27 20 27.9	0 50 47.13	0.841	2 59 5.7	4.77	
	28	0 50 50.10	0.842	2 59 22.6	4.78	28 20 24.3	0 51 7.20	0.831	3 0 59.5	4.70	
	29	0 51 10.19	0.832	3 1 16.4	4.70	29 20 20.7	0 51 27.04	0.821	3 2 51.5	4.63	
	30	0 51 30.04	0.822	3 3 8.4	4.63	30 20 17.1	0 51 46.63	0.811	3 4 41.8	4.56	
	31	0 51 49.65	0.812	3 4 58.7	4.56	31 20 13.5	0 52 5.98	0.801	3 6 30.3	4.49	
June	1	0 52 9.01	0.802	3 6 47.2	4.49	1 20 9.9	0 52 25.08	0.791	3 8 17.1	4.42	
	2	0 52 28.12	0.791	3 8 34.0	4.41	2 20 6.2	0 52 43.93	0.780	3 10 2.1	4.34	
	3	0 52 46.97	0.781	3 10 19.0	4.34	3 20 2.6	0 53 2.53	0.770	3 11 45.3	4.27	
	4	0 53 5.57	0.770	3 12 2.2	4.26	4 19 59.0	0 53 20.86	0.759	3 13 26.7	4.19	
	5	0 53 23.91	0.759	3 13 43.5	4.19	5 19 55.4	0 53 38.94	0.748	3 15 6.2	4.12	
	6	0 53 41.99	0.747	3 15 23.0	4.11	6 19 51.7	0 53 56.75	0.737	3 16 44.0	4.04	
	7	0 53 59.80	0.736	3 17 0.7	4.03	7 19 48.1	0 54 14.30	0.726	3 18 19.8	3.96	
	8	0 54 17.35	0.725	3 18 36.4	3.95	8 19 44.4	0 54 31.58	0.714	3 19 53.8	3.88	
	9	0 54 34.62	0.714	3 20 10.3	3.87	9 19 40.8	0 54 48.58	0.703	3 21 25.9	3.80	
	10	0 54 51.62	0.702	3 21 42.3	3.79	10 19 37.1	0 55 5.30	0.691	3 22 56.0	3.72	
	11	0 55 8.33	0.691	3 23 12.3	3.71	11 19 33.5	0 55 21.74	0.679	3 24 24.2	3.63	
	12	0 55 24.76	0.679	3 24 40.3	3.63	12 19 29.8	0 55 37.89	0.667	3 25 50.4	3.55	
	13	0 55 40.90	0.667	3 26 6.4	3.55	13 19 26.1	0 55 53.76	0.655	3 27 14.7	3.46	
	14	0 55 56.75	0.654	3 27 30.5	3.46	14 19 22.5	0 56 9.34	0.643	3 28 36.9	3.38	
	15	0 56 12.31	0.642	3 28 52.5	3.38	15 19 18.8	0 56 24.62	0.630	3 29 57.0	3.29	
	16	0 56 27.57	0.630	3 30 12.5	3.29	16 19 15.1	0 56 39.60	0.618	3 31 15.2	3.21	
	17	0 56 42.53	0.617	3 31 30.5	3.21	17 19 11.4	0 56 54.27	0.605	3 32 31.3	3.12	
	18	0 56 57.18	0.604	3 32 46.4	3.12	18 19 7.7	0 57 8.64	0.592	3 33 45.3	3.04	
	19	0 57 11.52	0.591	3 34 0.2	3.03	19 19 4.0	0 57 22.70	0.579	3 34 57.3	2.95	
	20	0 57 25.55	0.578	3 35 11.9	2.94	20 19 0.3	0 57 36.45	0.566	3 36 7.0	2.86	
	21	0 57 39.27	0.565	3 36 21.4	2.85	21 18 56.6	0 57 49.88	0.553	3 37 14.7	2.78	
	22	0 57 52.67	0.551	3 37 28.8	2.76	22 18 52.9	0 58 2.99	0.540	3 38 20.3	2.69	
	23	0 58 5.74	0.538	3 38 34.1	2.68	23 18 49.2	0 58 15.77	0.526	3 39 23.7	2.60	
	24	0 58 18.49	0.525	3 39 37.2	2.59	24 18 45.5	0 58 28.24	0.513	3 40 25.0	2.51	
	25	0 58 30.92	0.511	3 40 38.2	2.50	25 18 41.7	0 58 40.38	0.499	3 41 24.0	2.42	
	26	0 58 43.02	0.497	3 41 36.9	2.40	26 18 38.0	0 58 52.18	0.485	3 42 20.9	2.33	
	27	0 58 54.78	0.483	3 42 33.5	2.31	27 18 34.3	0 59 3.66	0.471	3 43 15.7	2.24	
	28	0 59 6.21	0.469	3 43 27.9	2.22	28 18 30.5	0 59 14.79	0.457	3 44 8.3	2.15	
	29	0 59 17.30	0.455	3 44 20.1	2.13	29 18 26.8	0 59 25.60	0.443	3 44 58.7	2.06	
	30	0 59 28.06	0.441	3 45 10.1	2.04	30 18 23.0	0 59 36.07	0.429	3 45 46.8	1.96	
	31	0 59 38.48	+0.427	+3 45 57.8	+1.95	31 18 19.2	0 59 46.20	+0.414	+3 46 32.7	+1.87	

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
July	1	h m s 0 59 38.48	+0.427	+3 45 57.8	+1.95	d h m 1 18 19.2	h m s 0 59 46.20	+0.414	+3 46 32.7	+1.87
	2	0 59 48.55	0.412	3 46 43.3	1.85	2 18 15.5	0 59 55.98	0.400	3 47 16.4	1.77
	3	0 59 58.28	0.398	3 47 26.6	1.76	3 18 11.7	1 0 5.42	0.386	3 47 57.9	1.68
	4	1 0 7.66	0.384	3 48 7.6	1.66	4 18 7.9	1 0 14.51	0.371	3 48 37.1	1.59
	5	1 0 16.69	0.369	3 48 46.3	1.56	5 18 4.1	1 0 23.26	0.357	3 49 14.0	1.50
	6	1 0 25.37	0.354	3 49 22.8	1.46	6 18 0.3	1 0 31.64	0.342	3 49 48.7	1.40
	7	1 0 33.69	0.340	3 49 57.0	1.37	7 17 56.5	1 0 39.68	0.327	3 50 21.1	1.31
	8	1 0 41.66	0.325	3 50 28.9	1.28	8 17 52.7	1 0 47.36	0.312	3 50 51.2	1.21
	9	1 0 49.27	0.310	3 50 58.5	1.19	9 17 48.9	1 0 54.69	0.297	3 51 19.0	1.11
	10	1 0 56.52	0.295	3 51 25.8	1.09	10 17 45.1	1 1 1.65	0.282	3 51 44.5	1.01
	11	1 1 3.41	0.280	3 51 50.7	0.99	11 17 41.3	1 1 8.25	0.267	3 52 7.6	0.92
	12	1 1 9.93	0.264	3 52 13.3	0.89	12 17 37.5	1 1 14.48	0.252	3 52 28.4	0.82
	13	1 1 16.08	0.249	3 52 33.5	0.80	13 17 33.6	1 1 20.36	0.236	3 52 46.8	0.72
	14	1 1 21.87	0.233	3 52 51.4	0.70	14 17 29.8	1 1 25.85	0.221	3 53 3.0	0.62
	15	1 1 27.28	0.218	3 53 7.0	0.60	15 17 25.9	1 1 30.98	0.206	3 53 16.8	0.52
	16	1 1 32.32	0.202	3 53 20.2	0.50	16 17 22.1	1 1 35.73	0.190	3 53 28.3	0.43
	17	1 1 36.98	0.187	3 53 31.1	0.40	17 17 18.2	1 1 40.11	0.175	3 53 37.4	0.33
	18	1 1 41.26	0.171	3 53 39.6	0.30	18 17 14.4	1 1 44.11	0.159	3 53 44.2	0.23
	19	1 1 45.17	0.155	3 53 45.7	0.21	19 17 10.5	1 1 47.74	0.144	3 53 48.5	0.13
	20	1 1 48.70	0.139	3 53 49.4	0.11	20 17 6.6	1 1 50.98	0.128	3 53 50.6	+0.04
	21	1 1 51.84	0.123	3 53 50.8	+0.01	21 17 2.7	1 1 53.84	0.112	3 53 50.3	-0.06
	22	1 1 54.60	0.107	3 53 49.8	-0.09	22 16 58.8	1 1 56.34	0.096	3 53 47.7	0.16
	23	1 1 56.99	0.092	3 53 46.4	0.19	23 16 54.9	1 1 58.45	0.080	3 53 42.7	0.26
	24	1 1 59.00	0.076	3 53 40.7	0.29	24 16 51.0	1 2 0.19	0.064	3 53 35.4	0.35
	25	1 2 0.63	0.060	3 53 32.7	0.30	25 16 47.1	1 2 1.55	0.049	3 53 25.7	0.45
	26	1 2 1.88	0.044	3 53 22.3	0.48	26 16 43.2	1 2 2.52	0.033	3 53 13.7	0.55
	27	1 2 2.74	0.028	3 53 9.6	0.58	27 16 39.3	1 2 3.13	0.017	3 52 59.4	0.64
	28	1 2 3.23	+0.012	3 52 54.6	0.67	28 16 35.4	1 2 3.35	+0.001	3 52 42.8	0.74
	29	1 2 3.33	-0.004	3 52 37.2	0.77	29 16 31.4	1 2 3.19	-0.015	3 52 23.9	0.83
	30	1 2 3.05	0.020	3 52 17.5	0.87	30 16 27.5	1 2 2.65	0.031	3 52 2.7	0.93
	31	1 2 2.39	0.036	3 51 55.5	0.97	31 16 23.5	1 2 1.72	0.047	3 51 39.2	1.03
Aug.	1	1 2 1.35	0.051	3 51 31.2	1.06	1 16 19.6	1 2 0.43	0.062	3 51 13.5	1.12
	2	1 1 59.93	0.067	3 51 4.7	1.16	2 16 15.6	1 1 58.76	0.078	3 50 45.4	1.22
	3	1 1 58.14	0.082	3 50 35.8	1.25	3 16 11.7	1 1 56.72	0.093	3 50 15.1	1.31
	4	1 1 55.97	0.098	3 50 4.7	1.35	4 16 7.7	1 1 54.31	0.109	3 49 42.5	1.40
	5	1 1 53.43	0.114	3 49 31.3	1.44	5 16 3.7	1 1 51.52	0.124	3 49 7.7	1.50
	6	1 1 50.51	0.130	3 48 55.7	1.53	6 15 59.7	1 1 48.36	0.140	3 48 30.7	1.59
	7	1 1 47.22	0.145	3 48 17.8	1.62	7 15 55.7	1 1 44.83	0.155	3 47 51.4	1.68
	8	1 1 43.55	0.161	3 47 37.7	1.72	8 15 51.7	1 1 40.92	0.170	3 47 10.0	1.77
	9	1 1 39.51	0.176	3 46 55.4	1.81	9 15 47.7	1 1 36.64	0.186	3 46 26.3	1.87
	10	1 1 35.00	0.192	3 46 10.8	1.90	10 15 43.7	1 1 32.00	0.201	3 45 40.3	1.96
	11	1 1 30.31	0.207	3 45 24.0	1.99	11 15 39.7	1 1 26.99	0.216	3 44 52.3	2.05
	12	1 1 25.16	0.222	3 44 35.1	2.08	12 15 35.7	1 1 21.61	0.231	3 44 2.1	2.14
	13	1 1 19.64	0.237	3 43 44.0	2.17	13 15 31.7	1 1 15.87	0.246	3 43 9.8	2.23
	14	1 1 13.76	0.253	3 42 50.8	2.26	14 15 27.6	1 1 9.78	0.261	3 42 15.3	2.31
	15	1 1 7.52	0.268	3 41 55.4	2.35	15 15 23.6	1 1 3.32	0.276	3 41 18.8	2.40
	16	1 1 0.91	0.283	3 40 58.0	2.44	16 15 19.5	1 0 56.51	0.291	3 40 20.2	2.49
	17	1 0 53.95	0.298	3 39 58.5	2.52	17 15 15.5	1 0 49.34	0.306	3 39 19.6	2.57
	18	1 0 46.63	0.312	3 38 57.0	2.61	18 15 11.4	1 0 41.82	0.320	3 38 17.0	2.66
	19	1 0 38.97	0.326	3 37 53.4	2.69	19 15 7.4	1 0 33.96	0.335	3 37 12.3	2.74
	20	1 0 30.96	0.341	3 36 47.8	2.77	20 15 3.3	1 0 25.76	0.349	3 36 5.7	2.82
	21	1 0 22.61	0.355	3 35 40.3	2.85	21 14 59.2	1 0 17.22	0.363	3 34 57.2	2.90
	22	1 0 13.92	0.369	3 34 30.9	2.93	22 14 55.1	1 0 8.35	0.377	3 33 46.8	2.97
	23	1 0 4.89	0.383	3 33 19.6	3.01	23 14 51.1	0 59 59.15	0.390	3 32 34.5	3.05
	24	0 59 55.54	0.397	3 32 6.4	3.09	24 14 47.0	0 59 49.62	0.403	3 31 20.4	3.12
	25	0 59 45.86	0.410	3 30 51.4	3.16	25 14 42.9	0 59 39.78	0.416	3 30 4.6	3.20
	26	0 59 35.87	0.423	3 29 34.7	3.24	26 14 38.8	0 59 29.62	0.429	3 28 47.0	3.27
	27	0 59 25.56	0.436	3 28 16.2	3.31	27 14 34.7	0 59 19.15	0.442	3 27 27.6	3.34
	28	0 59 14.94	0.449	3 26 55.9	3.38	28 14 30.6	0 59 8.38	0.455	3 26 6.6	3.41
	29	0 59 4.02	0.461	3 25 34.0	3.45	29 14 26.4	0 58 57.30	0.467	3 24 43.9	3.48
	30	0 58 52.79	0.474	3 24 10.4	3.52	30 14 22.3	0 58 45.93	0.480	3 23 19.6	3.54
	31	0 58 41.27	-0.486	+3 22 45.2	-3.58	31 14 18.2	0 58 34.27	-0.492	+3 21 53.7	-3.61

Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1	h m s 0 58 29.46	-0.498	+3 21' 16.5	-3.65	d h m 1 14 14.1	h m s 0 58 22.33	-0.504	+3 20' 26.4	-3.67
2	0 58 17.37	0.510	3 19 50.3	3.71	2 14 9.9	0 58 10.11	0.515	3 18 57.5	3.73
3	0 58 5.00	0.521	3 18 20.5	3.77	3 14 5.8	0 57 57.61	0.526	3 17 27.1	3.79
4	0 57 52.36	0.532	3 16 49.3	3.83	4 14 1.6	0 57 44.85	0.537	3 15 55.3	3.85
5	0 57 39.45	0.543	3 15 16.6	3.89	5 13 57.5	0 57 31.82	0.548	3 14 22.1	3.91
6	0 57 26.28	0.554	3 13 42.5	3.95	6 13 53.4	0 57 18.54	0.558	3 12 47.5	3.96
7	0 57 12.85	0.565	3 12 7.1	4.00	7 13 49.2	0 57 5.02	0.569	3 11 11.6	4.02
8	0 56 59.18	0.575	3 10 30.4	4.05	8 13 45.0	0 56 51.24	0.579	3 9 34.5	4.07
9	0 56 45.26	0.585	3 8 52.5	4.10	9 13 40.9	0 56 37.23	0.589	3 7 56.1	4.12
10	0 56 31.11	0.595	3 7 13.4	4.15	10 13 36.7	0 56 22.98	0.598	3 6 16.6	4.17
11	0 56 16.72	0.604	3 5 33.1	4.20	11 13 32.5	0 56 8.50	0.607	3 4 36.0	4.22
12	0 56 2.11	0.613	3 3 51.7	4.25	12 13 28.4	0 55 53.82	0.616	3 2 54.4	4.26
13	0 55 47.29	0.622	3 2 9.3	4.29	13 13 24.2	0 55 38.92	0.624	3 1 11.7	4.30
14	0 55 32.26	0.630	3 0 25.9	4.33	14 13 20.0	0 55 23.83	0.632	2 59 28.0	4.34
15	0 55 17.04	0.638	2 58 41.5	4.37	15 13 15.8	0 55 8.54	0.640	2 57 43.5	4.37
16	0 55 1.62	0.646	2 56 56.3	4.40	16 13 11.6	0 54 53.06	0.648	2 55 58.1	4.41
17	0 54 46.02	0.654	2 55 10.2	4.44	17 13 7.4	0 54 37.42	0.655	2 54 11.9	4.44
18	0 54 30.25	0.661	2 53 23.4	4.47	18 13 3.2	0 54 21.60	0.662	2 52 24.9	4.47
19	0 54 14.31	0.668	2 51 35.8	4.50	19 12 59.0	0 54 5.61	0.669	2 50 37.3	4.49
20	0 53 58.21	0.674	2 49 47.6	4.52	20 12 54.8	0 53 49.49	0.675	2 48 49.1	4.52
21	0 53 41.97	0.680	2 47 58.8	4.54	21 12 50.6	0 53 33.22	0.681	2 47 0.3	4.54
22	0 53 25.59	0.685	2 46 9.5	4.56	22 12 46.4	0 53 16.82	0.686	2 45 11.0	4.56
23	0 53 9.08	0.690	2 44 19.7	4.58	23 12 42.2	0 53 0.29	0.691	2 43 21.3	4.57
24	0 52 52.45	0.695	2 42 29.5	4.60	24 12 38.0	0 52 43.66	0.695	2 41 31.2	4.59
25	0 52 35.72	0.700	2 40 38.9	4.61	25 12 33.8	0 52 26.92	0.699	2 39 40.8	4.60
26	0 52 18.88	0.704	2 38 48.0	4.62	26 12 29.6	0 52 10.08	0.703	2 37 50.2	4.61
27	0 52 1.95	0.708	2 36 56.9	4.63	27 12 25.4	0 51 53.15	0.707	2 35 59.3	4.62
28	0 51 44.93	0.711	2 35 5.6	4.64	28 12 21.2	0 51 36.14	0.710	2 34 8.2	4.63
29	0 51 27.84	0.714	2 33 14.1	4.65	29 12 17.0	0 51 19.06	0.713	2 32 17.1	4.63
30	0 51 10.68	0.716	2 31 22.6	4.65	30 12 12.7	0 51 1.93	0.715	2 30 25.8	4.64
Oct. 1	0 50 53.47	0.718	2 29 31.0	4.65	1 12 8.5	0 50 44.74	0.717	2 28 34.6	4.64
2	0 50 36.21	0.720	2 27 39.5	4.64	2 12 4.3	0 50 27.50	0.719	2 26 43.4	4.63
3	0 50 18.90	0.722	2 25 48.1	4.64	3 12 0.1	0 50 10.24	0.720	2 24 52.3	4.62
4	0 50 1.57	0.723	2 23 56.8	4.63	4 11 55.9	0 49 52.93	0.721	2 23 1.5	4.61
5	0 49 44.21	0.724	2 22 5.8	4.62	5 11 51.6	0 49 35.62	0.722	2 21 11.0	4.60
6	0 49 26.84	0.724	2 20 15.0	4.61	6 11 47.4	0 49 18.30	0.722	2 19 20.7	4.59
7	0 49 9.46	0.724	2 18 24.6	4.60	7 11 43.2	0 49 0.98	0.722	2 17 30.8	4.57
8	0 48 52.09	0.724	2 16 34.5	4.58	8 11 39.0	0 48 43.67	0.721	2 15 41.2	4.55
9	0 48 34.73	0.723	2 14 44.9	4.56	9 11 34.8	0 48 26.38	0.720	2 13 52.2	4.53
10	0 48 17.40	0.721	2 12 55.8	4.53	10 11 30.5	0 48 9.11	0.719	2 12 3.7	4.51
11	0 48 0.10	0.719	2 11 7.3	4.51	11 11 26.3	0 47 51.88	0.717	2 10 15.8	4.48
12	0 47 42.85	0.717	2 9 19.4	4.48	12 11 22.1	0 47 34.70	0.715	2 8 28.5	4.45
13	0 47 25.66	0.715	2 7 32.3	4.45	13 11 17.9	0 47 17.59	0.712	2 6 42.1	4.42
14	0 47 8.53	0.712	2 5 45.9	4.42	14 11 13.7	0 47 0.54	0.709	2 4 56.4	4.39
15	0 46 51.48	0.709	2 4 0.3	4.38	15 11 9.5	0 46 43.58	0.705	2 3 11.5	4.35
16	0 46 34.51	0.705	2 2 15.6	4.34	16 11 5.3	0 46 26.70	0.701	2 1 27.5	4.31
17	0 46 17.63	0.701	2 0 31.9	4.30	17 11 1.0	0 46 9.91	0.697	1 59 44.6	4.27
18	0 46 0.85	0.697	1 58 49.2	4.26	18 10 56.8	0 45 53.23	0.692	1 58 2.7	4.22
19	0 45 44.19	0.692	1 57 7.6	4.21	19 10 52.6	0 45 36.67	0.687	1 56 21.9	4.17
20	0 45 27.65	0.686	1 55 27.2	4.16	20 10 48.4	0 45 20.24	0.682	1 54 42.3	4.12
21	0 45 11.25	0.681	1 53 47.9	4.11	21 10 44.2	0 45 3.95	0.676	1 53 3.8	4.07
22	0 44 54.99	0.675	1 52 9.9	4.06	22 10 40.0	0 44 47.81	0.670	1 51 26.7	4.02
23	0 44 38.87	0.668	1 50 33.1	4.01	23 10 35.8	0 44 31.81	0.663	1 49 50.7	3.96
24	0 44 22.92	0.661	1 48 57.7	3.95	24 10 31.6	0 44 15.98	0.656	1 48 16.2	3.91
25	0 44 7.13	0.654	1 47 23.7	3.89	25 10 27.4	0 44 0.31	0.649	1 46 43.1	3.85
26	0 43 51.52	0.646	1 45 51.2	3.82	26 10 23.2	0 43 44.82	0.641	1 45 11.5	3.79
27	0 43 36.10	0.639	1 44 20.1	3.76	27 10 19.1	0 43 29.53	0.633	1 43 41.4	3.73
28	0 43 20.87	0.631	1 42 50.6	3.70	28 10 14.9	0 43 14.43	0.625	1 42 12.8	3.66
29	0 43 5.83	0.622	1 41 22.6	3.63	29 10 10.7	0 42 59.52	0.617	1 40 45.8	3.59
30	0 42 51.00	0.613	1 39 56.3	3.56	30 10 6.5	0 42 44.42	0.608	1 39 20.4	3.52
31	0 42 36.39	-0.604	+1 38 31.7	-3.49	31 10 2.3	0 42 30.35	-0.599	+1 37 56.8	-3.45

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.					
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Nov. 1		h m s 0 42 22.00	-0.595	+1° 37' 58"	-3.42	d h m 1 9 58.2	h m s 0 42 16.09	-0.589	+1° 36' 34.8"	-3.37	
2		0 42 7.84	0.585	1 35 47.7	3.35	2 9 54.0	0 42 2.07	0.579	1 35 14.7	3.30	
3		0 41 53.92	0.575	1 34 28.4	3.27	3 9 49.9	0 41 48.28	0.569	1 33 56.4	3.22	
4		0 41 40.25	0.565	1 33 10.9	3.19	4 9 45.7	0 41 34.75	0.559	1 32 39.9	3.14	
5		0 41 26.83	0.554	1 31 55.3	3.11	5 9 41.6	0 41 21.47	0.548	1 31 25.3	3.06	
6		0 41 13.66	0.543	1 30 41.7	3.03	6 9 37.4	0 41 8.45	0.537	1 30 12.7	2.98	
7		0 41 0.76	0.532	1 29 30.0	2.94	7 9 33.3	0 40 55.69	0.526	1 29 2.1	2.90	
8		0 40 48.14	0.521	1 28 20.4	2.86	8 9 29.1	0 40 43.22	0.514	1 27 53.5	2.81	
9		0 40 35.79	0.509	1 27 12.8	2.77	9 9 25.0	0 40 31.02	0.502	1 26 46.9	2.73	
10		0 40 23.73	0.497	1 26 7.3	2.68	10 9 20.9	0 40 19.11	0.490	1 25 42.4	2.64	
11		0 40 11.96	0.484	1 25 4.0	2.59	11 9 16.7	0 40 7.49	0.478	1 24 40.2	2.55	
12		0 40 0.50	0.471	1 24 2.8	2.50	12 9 12.6	0 39 56.18	0.465	1 23 40.0	2.46	
13		0 39 49.35	0.458	1 23 3.9	2.41	13 9 8.5	0 39 45.18	0.452	1 22 42.1	2.36	
14		0 39 38.51	0.445	1 22 7.2	2.32	14 9 4.4	0 39 34.49	0.439	1 21 46.4	2.27	
15		0 39 27.99	0.432	1 21 12.8	2.22	15 9 0.3	0 39 24.12	0.425	1 20 53.0	2.17	
16		0 39 17.79	0.418	1 20 20.8	2.12	16 8 56.2	0 39 14.07	0.411	1 20 2.0	2.08	
17		0 39 7.93	0.404	1 19 31.1	2.02	17 8 52.1	0 39 4.36	0.397	1 19 13.3	1.98	
18		0 38 58.40	0.390	1 18 43.7	1.92	18 8 48.0	0 38 54.96	0.383	1 18 27.0	1.88	
19		0 38 49.22	0.375	1 17 58.7	1.82	19 8 43.9	0 38 45.96	0.369	1 17 43.0	1.78	
20		0 38 40.38	0.361	1 17 16.2	1.72	20 8 39.8	0 38 37.27	0.354	1 17 1.5	1.68	
21		0 38 31.89	0.346	1 16 36.1	1.62	21 8 35.8	0 38 28.93	0.340	1 16 22.4	1.58	
22		0 38 23.76	0.331	1 15 58.5	1.52	22 8 31.7	0 38 20.96	0.325	1 15 45.7	1.47	
23		0 38 15.98	0.316	1 15 23.3	1.41	23 8 27.6	0 38 13.33	0.310	1 15 11.5	1.37	
24		0 38 8.57	0.301	1 14 50.6	1.31	24 8 23.6	0 38 6.07	0.295	1 14 39.8	1.27	
25		0 38 1.52	0.286	1 14 20.4	1.21	25 8 19.6	0 37 59.17	0.280	1 14 10.5	1.16	
26		0 37 54.84	0.271	1 13 52.7	1.10	26 8 15.5	0 37 52.63	0.265	1 13 43.8	1.06	
27		0 37 48.53	0.255	1 13 27.6	0.99	27 8 11.5	0 37 46.46	0.249	1 13 19.6	0.96	
28		0 37 42.59	0.240	1 13 5.0	0.89	28 8 7.4	0 37 40.66	0.234	1 12 57.9	0.86	
29		0 37 37.03	0.224	1 12 45.0	0.78	29 8 3.4	0 37 35.25	0.218	1 12 38.8	0.75	
30		0 37 31.85	0.208	1 12 27.4	0.67	30 7 59.4	0 37 30.21	0.202	1 12 22.2	0.64	
Dec. 1		0 37 27.05	0.192	1 12 12.6	0.57	1 7 55.4	0 37 25.55	0.186	1 12 8.2	0.53	
2		0 37 22.63	0.176	1 12 0.2	0.46	2 7 51.4	0 37 21.27	0.170	1 11 56.7	0.43	
3		0 37 18.60	0.160	1 11 50.4	0.35	3 7 47.4	0 37 17.38	0.154	1 11 47.8	0.32	
4		0 37 14.96	0.144	1 11 43.3	0.24	4 7 43.4	0 37 13.87	0.138	1 11 41.5	0.21	
5		0 37 11.71	0.127	1 11 38.7	0.14	5 7 39.4	0 37 10.76	0.122	1 11 37.8	-0.10	
6		0 37 8.85	0.111	1 11 36.8	-0.03	6 7 35.4	0 37 8.03	0.106	1 11 36.7	+0.01	
7		0 37 6.39	0.094	1 11 37.5	+0.08	7 7 31.5	0 37 5.70	0.090	1 11 38.2	0.12	
8		0 37 4.32	0.078	1 11 40.8	0.19	8 7 27.5	0 37 3.76	0.073	1 11 42.4	0.23	
9		0 37 2.65	0.061	1 11 46.8	0.30	9 7 23.6	0 37 2.22	0.056	1 11 49.2	0.34	
10		0 37 1.38	0.045	1 11 55.4	0.42	10 7 19.6	0 37 1.07	0.040	1 11 58.6	0.45	
11		0 37 0.51	0.028	1 12 6.7	0.53	11 7 15.7	0 37 0.32	0.023	1 12 10.6	0.56	
12		0 37 0.05	-0.011	1 12 20.7	0.64	12 7 11.7	0 36 59.99	-0.006	1 12 25.4	0.67	
13		0 36 59.99	+0.006	1 12 37.3	0.75	13 7 7.8	0 37 0.05	+0.011	1 12 42.8	0.78	
14		0 37 0.34	0.023	1 12 56.5	0.86	14 7 3.9	0 37 0.52	0.028	1 13 2.7	0.89	
15		0 37 1.10	0.040	1 13 18.4	0.97	15 7 0.0	0 37 1.39	0.045	1 13 25.3	1.00	
16		0 37 2.26	0.057	1 13 42.9	1.08	16 6 56.0	0 37 2.67	0.061	1 13 50.5	1.10	
17		0 37 3.82	0.074	1 14 10.1	1.19	17 6 52.1	0 37 4.34	0.078	1 14 18.4	1.21	
18		0 37 5.79	0.091	1 14 39.8	1.30	18 6 48.2	0 37 6.42	0.095	1 14 48.7	1.32	
19		0 37 8.16	0.107	1 15 12.1	1.40	19 6 44.3	0 37 8.90	0.111	1 15 21.6	1.42	
20		0 37 10.94	0.124	1 15 47.0	1.51	20 6 40.5	0 37 11.78	0.128	1 15 57.1	1.53	
21		0 37 14.12	0.140	1 16 24.5	1.61	21 6 36.6	0 37 15.06	0.145	1 16 35.2	1.64	
22		0 37 17.70	0.157	1 17 4.5	1.72	22 6 32.7	0 37 18.74	0.162	1 17 15.8	1.74	
23		0 37 21.69	0.174	1 17 47.1	1.83	23 6 28.9	0 37 22.83	0.178	1 17 59.0	1.85	
24		0 37 26.07	0.191	1 18 32.2	1.94	24 6 25.0	0 37 27.30	0.195	1 18 44.7	1.96	
25		0 37 30.85	0.207	1 19 19.8	2.04	25 6 21.1	0 37 32.18	0.211	1 19 32.8	2.06	
26		0 37 36.02	0.224	1 20 10.0	2.15	26 6 17.3	0 37 37.44	0.228	1 20 23.6	2.16	
27		0 37 41.58	0.240	1 21 2.7	2.25	27 6 13.5	0 37 43.09	0.244	1 21 16.8	2.27	
28		0 37 47.54	0.257	1 21 57.8	2.35	28 6 9.6	0 37 49.14	0.260	1 22 12.4	2.37	
29		0 37 53.89	0.273	1 22 55.4	2.45	29 6 5.8	0 37 55.57	0.276	1 23 10.4	2.47	
30		0 38 0.63	0.289	1 23 55.4	2.55	30 6 2.0	0 38 2.39	0.292	1 24 10.8	2.57	
31		0 38 7.76	0.305	1 24 57.9	2.65	31 5 58.2	0 38 9.59	0.308	1 25 13.7	2.67	
32		0 38 15.27	+0.321	+1 26 2.8	+2.75	32 5 54.4	0 38 17.17	+0.323	+1 26 19.0	+2.76	



Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT,				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Jan. 0	<sup>h</sup> <sup>m</sup> <sup>s</sup> 10 24 48.33	<sup>s</sup> -0.186	<sup>°</sup> <sup>'</sup> <sup>"</sup> 10 46 13.1	<sup>"</sup> +1.17	<sup>d</sup> <sup>h</sup> <sup>m</sup> 0 15 42.2	<sup>h</sup> <sup>m</sup> <sup>s</sup> 10 24 45.38	<sup>s</sup> -0.190	<sup>°</sup> <sup>'</sup> <sup>"</sup> 10 46 31.7	<sup>"</sup> +1.20
1	10 24 43.78	0.193	10 46 41.8	1.22	1 15 38.2	10 24 40.72	0.198	10 47 1.1	1.25
2	10 24 39.04	0.201	10 47 11.6	1.26	2 15 34.2	10 24 35.87	0.206	10 47 31.5	1.29
3	10 24 34.12	0.209	10 47 42.5	1.31	3 15 30.2	10 24 30.84	0.213	10 48 2.9	1.33
4	10 24 29.01	0.216	10 48 14.3	1.35	4 15 26.2	10 24 25.63	0.220	10 48 35.3	1.37
5	10 24 23.73	0.224	10 48 47.1	1.39	5 15 22.2	10 24 20.25	0.228	10 49 8.6	1.41
6	10 24 18.26	0.231	10 49 20.9	1.43	6 15 18.1	10 24 14.69	0.235	10 49 42.9	1.45
7	10 24 12.62	0.239	10 49 55.7	1.47	7 15 14.1	10 24 8.95	0.243	10 50 18.2	1.49
8	10 24 6.81	0.246	10 50 31.5	1.51	8 15 10.1	10 24 3.04	0.250	10 50 54.5	1.53
9	10 24 0.82	0.253	10 51 8.2	1.55	9 15 6.0	10 23 56.96	0.257	10 51 31.7	1.57
10	10 23 54.66	0.260	10 51 45.8	1.59	10 15 2.0	10 23 50.72	0.264	10 52 9.8	1.61
11	10 23 48.34	0.267	10 52 24.4	1.63	11 14 57.9	10 23 44.31	0.271	10 52 48.8	1.64
12	10 23 41.85	0.274	10 53 3.8	1.66	12 14 53.9	10 23 37.74	0.277	10 53 28.7	1.68
13	10 23 35.20	0.280	10 53 44.1	1.70	13 14 49.8	10 23 31.02	0.284	10 54 9.5	1.72
14	10 23 28.40	0.287	10 54 25.3	1.73	14 14 45.8	10 23 24.13	0.291	10 54 51.1	1.75
15	10 23 21.44	0.294	10 55 7.4	1.77	15 14 41.7	10 23 17.09	0.297	10 55 33.5	1.78
16	10 23 14.32	0.300	10 55 50.2	1.80	16 14 37.7	10 23 9.91	0.303	10 56 16.7	1.82
17	10 23 7.05	0.306	10 56 33.9	1.83	17 14 33.6	10 23 2.58	0.309	10 57 0.8	1.85
18	10 22 59.64	0.311	10 57 18.4	1.87	18 14 29.6	10 22 55.10	0.314	10 57 45.6	1.88
19	10 22 52.09	0.317	10 58 3.6	1.90	19 14 25.5	10 22 47.48	0.320	10 58 31.1	1.91
20	10 22 44.39	0.323	10 58 49.5	1.93	20 14 21.5	10 22 39.72	0.326	10 59 17.3	1.94
21	10 22 36.56	0.328	10 59 36.2	1.96	21 14 17.4	10 22 31.83	0.331	11 0 4.3	1.97
22	10 22 28.60	0.334	11 0 23.5	1.99	22 14 13.3	10 22 23.22	0.336	11 0 51.9	2.00
23	10 22 20.51	0.339	11 1 11.6	2.02	23 14 9.3	10 22 15.68	0.342	11 1 40.3	2.03
24	10 22 12.29	0.344	11 2 0.4	2.04	24 14 5.2	10 22 7.41	0.347	11 2 29.2	2.05
25	10 22 3.95	0.349	11 2 49.7	2.07	25 14 1.1	10 21 59.02	0.352	11 3 18.8	2.08
26	10 21 55.50	0.354	11 3 39.6	2.09	26 13 57.1	10 21 50.52	0.356	11 4 8.9	2.10
27	10 21 46.93	0.359	11 4 30.1	2.12	27 13 53.0	10 21 41.91	0.361	11 4 59.6	2.12
28	10 21 38.25	0.364	11 5 21.2	2.14	28 13 48.9	10 21 33.20	0.365	11 5 50.9	2.15
29	10 21 29.47	0.368	11 6 12.8	2.16	29 13 44.8	10 21 24.39	0.369	11 6 42.6	2.17
30	10 21 20.58	0.372	11 7 4.9	2.18	30 13 40.8	10 21 15.48	0.373	11 7 34.8	2.19
31	10 21 11.61	0.376	11 7 57.5	2.20	31 13 36.7	10 21 6.47	0.377	11 8 27.5	2.21
Feb. 1	10 21 2.54	0.380	11 8 50.5	2.22	1 13 32.6	10 20 57.37	0.381	11 9 20.7	2.22
2	10 20 53.38	0.384	11 9 44.1	2.24	2 13 28.5	10 20 48.19	0.384	11 10 14.3	2.24
3	10 20 44.13	0.387	11 10 38.0	2.26	3 13 24.4	10 20 38.93	0.388	11 11 8.2	2.26
4	10 20 34.81	0.390	11 11 32.2	2.27	4 13 20.3	10 20 29.59	0.391	11 12 2.5	2.27
5	10 20 25.41	0.393	11 12 26.8	2.28	5 13 16.2	10 20 20.18	0.394	11 12 57.2	2.28
6	10 20 15.94	0.396	11 13 21.8	2.29	6 13 12.1	10 20 10.70	0.397	11 13 52.1	2.30
7	10 20 6.40	0.399	11 14 17.0	2.31	7 13 8.0	10 20 1.15	0.399	11 14 47.4	2.31
8	10 19 56.80	0.402	11 15 12.6	2.32	8 13 4.0	10 19 51.54	0.402	11 15 42.9	2.32
9	10 19 47.14	0.404	11 16 8.4	2.33	9 12 59.9	10 19 41.88	0.404	11 16 38.7	2.33
10	10 19 37.42	0.406	11 17 4.4	2.34	10 12 55.8	10 19 32.16	0.406	11 17 34.7	2.34
11	10 19 27.65	0.408	11 18 0.7	2.35	11 12 51.7	10 19 22.40	0.408	11 18 30.9	2.35
12	10 19 17.84	0.410	11 18 57.1	2.36	12 12 47.6	10 19 12.59	0.410	11 19 27.3	2.35
13	10 19 7.98	0.412	11 19 53.8	2.36	13 12 43.5	10 19 2.74	0.411	11 20 23.8	2.36
14	10 18 58.09	0.413	11 20 50.5	2.37	14 12 39.4	10 18 52.86	0.413	11 21 20.4	2.36
15	10 18 48.16	0.414	11 21 47.3	2.37	15 12 35.3	10 18 42.94	0.414	11 22 17.1	2.37
16	10 18 38.21	0.416	11 22 44.2	2.37	16 12 31.2	10 18 33.00	0.415	11 23 14.0	2.37
17	10 18 28.22	0.417	11 23 41.2	2.38	17 12 27.1	10 18 23.04	0.416	11 24 10.9	2.37
18	10 18 18.22	0.417	11 24 38.3	2.38	18 12 23.0	10 18 13.05	0.417	11 25 7.7	2.37
19	10 18 8.21	0.418	11 25 35.3	2.38	19 12 18.9	10 18 3.06	0.417	11 26 4.6	2.37
20	10 17 58.16	0.418	11 26 32.3	2.37	20 12 14.8	10 17 53.06	0.417	11 27 1.4	2.37
21	10 17 48.14	0.418	11 27 29.3	2.37	21 12 10.7	10 17 43.05	0.417	11 27 58.2	2.36
22	10 17 38.11	0.418	11 28 26.2	2.37	22 12 6.6	10 17 33.04	0.417	11 28 54.9	2.36
23	10 17 28.07	0.418	11 29 23.0	2.36	23 12 2.5	10 17 23.05	0.417	11 29 51.4	2.35
24	10 17 18.05	0.418	11 30 19.6	2.35	24 11 58.4	10 17 13.06	0.416	11 30 47.7	2.34
25	10 17 8.04	0.417	11 31 16.0	2.35	25 11 54.3	10 17 3.08	0.416	11 31 43.9	2.34
26	10 16 58.05	0.417	11 32 12.3	2.34	26 11 50.2	10 16 53.13	0.415	11 32 39.9	2.33
27	10 16 48.09	0.416	11 33 8.5	2.33	27 11 46.2	10 16 43.21	0.413	11 33 35.8	2.32
28	10 16 38.15	0.414	11 34 4.3	2.32	28 11 42.1	10 16 33.32	0.412	11 34 31.4	2.31
29	10 16 28.25	-0.412	11 34 59.9	+2.31	29 11 38.0	10 16 23.46	-0.410	11 35 26.7	+2.30

Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"
1	10 16 28.25	-0.412	+11 34 59.9	+2.31	1 11 38.0	10 16 23.46	-0.410	+11 35 26.7	+2.30
2	10 16 18.38	0.410	11 35 55.2	2.30	2 11 33.9	10 16 13.64	0.409	11 36 21.7	2.29
3	10 16 8.55	0.408	11 36 50.1	2.28	3 11 29.8	10 16 3.86	0.407	11 37 16.4	2.27
4	10 15 58.77	0.406	11 37 44.8	2.27	4 11 25.7	10 15 54.13	0.405	11 38 10.7	2.26
5	10 15 49.04	0.404	11 38 39.2	2.26	5 11 21.6	10 15 44.45	0.402	11 39 4.7	2.24
6	10 15 39.36	0.402	11 39 33.1	2.24	6 11 17.5	10 15 34.83	0.400	11 39 58.3	2.22
7	10 15 29.74	0.400	11 40 26.6	2.22	7 11 13.4	10 15 25.26	0.398	11 40 51.5	2.21
8	10 15 20.18	0.397	11 41 19.7	2.20	8 11 9.3	10 15 15.75	0.395	11 41 44.2	2.19
9	10 15 10.68	0.394	11 42 12.3	2.19	9 11 5.2	10 15 6.31	0.392	11 42 36.5	2.17
10	10 15 1.25	0.391	11 43 4.5	2.17	10 11 1.2	10 14 56.95	0.389	11 43 28.4	2.15
11	10 14 51.90	0.388	11 43 56.2	2.15	11 10 57.1	10 14 47.65	0.386	11 44 19.7	2.13
12	10 14 42.62	0.385	11 44 47.4	2.12	12 10 53.0	10 14 38.44	0.382	11 45 10.5	2.10
13	10 14 33.43	0.381	11 45 38.1	2.10	13 10 48.9	10 14 29.31	0.378	11 46 0.7	2.08
14	10 14 24.32	0.378	11 46 28.2	2.08	14 10 44.8	10 14 20.27	0.375	11 46 50.4	2.06
15	10 14 15.30	0.374	11 47 17.7	2.05	15 10 40.7	10 14 11.31	0.371	11 47 39.6	2.04
16	10 14 6.37	0.370	11 48 6.7	2.03	16 10 36.7	10 14 2.45	0.367	11 48 28.1	2.01
17	10 13 57.54	0.366	11 48 55.0	2.00	17 10 32.6	10 13 53.69	0.363	11 49 16.0	1.98
18	10 13 48.81	0.361	11 49 42.7	1.97	18 10 28.5	10 13 45.03	0.358	11 50 3.3	1.96
19	10 13 40.19	0.357	11 50 29.8	1.95	19 10 24.4	10 13 36.48	0.354	11 50 50.0	1.93
20	10 13 31.67	0.352	11 51 16.2	1.92	20 10 20.3	10 13 28.04	0.349	11 51 35.9	1.90
21	10 13 23.27	0.347	11 52 1.8	1.89	21 10 16.3	10 13 19.71	0.344	11 52 21.2	1.87
22	10 13 14.99	0.342	11 52 46.8	1.86	22 10 12.2	10 13 11.50	0.339	11 53 5.6	1.84
23	10 13 6.82	0.337	11 53 31.0	1.83	23 10 8.1	10 13 3.41	0.334	11 53 49.4	1.81
24	10 12 58.79	0.332	11 54 14.5	1.79	24 10 4.1	10 12 55.45	0.328	11 54 32.4	1.78
25	10 12 50.88	0.326	11 54 57.1	1.76	25 10 0.0	10 12 47.62	0.323	11 55 14.7	1.74
26	10 12 43.10	0.321	11 55 39.0	1.73	26 9 55.9	10 12 39.92	0.317	11 55 56.1	1.71
27	10 12 35.46	0.315	11 56 20.0	1.69	27 9 51.9	10 12 32.35	0.312	11 56 36.6	1.67
28	10 12 27.95	0.310	11 57 0.2	1.66	28 9 47.8	10 12 24.93	0.307	11 57 16.4	1.64
29	10 12 20.59	0.304	11 57 39.7	1.62	29 9 43.8	10 12 17.65	0.301	11 57 55.4	1.61
30	10 12 13.37	0.298	11 58 18.2	1.59	30 9 39.7	10 12 10.51	0.295	11 58 33.5	1.57
31	10 12 6.30	0.292	11 58 55.9	1.55	31 9 35.7	10 12 3.51	0.288	11 59 10.7	1.53
Apr. 1	10 11 59.38	0.285	11 59 32.6	1.51	1 9 31.6	10 11 56.67	0.282	11 59 47.0	1.49
2	10 11 52.61	0.279	12 0 8.5	1.47	2 9 27.6	10 11 49.98	0.275	12 0 22.4	1.46
3	10 11 45.99	0.272	12 0 43.5	1.44	3 9 23.6	10 11 43.45	0.269	12 0 56.9	1.42
4	10 11 39.54	0.265	12 1 17.5	1.40	4 9 19.5	10 11 37.07	0.263	12 1 30.5	1.38
5	10 11 33.24	0.259	12 1 50.6	1.36	5 9 15.5	10 11 30.85	0.256	12 2 3.1	1.34
6	10 11 27.11	0.252	12 2 22.8	1.32	6 9 11.4	10 11 24.80	0.249	12 2 34.8	1.30
7	10 11 21.14	0.245	12 2 54.0	1.28	7 9 7.4	10 11 18.91	0.242	12 3 5.6	1.26
8	10 11 15.34	0.238	12 3 24.2	1.24	8 9 3.4	10 11 13.19	0.235	12 3 35.4	1.22
9	10 11 9.70	0.231	12 3 53.5	1.20	9 8 59.4	10 11 7.63	0.228	12 4 4.2	1.18
10	10 11 4.24	0.223	12 4 21.8	1.16	10 8 55.3	10 11 2.25	0.220	12 4 32.0	1.14
11	10 10 58.95	0.216	12 4 49.0	1.11	11 8 51.3	10 10 57.04	0.213	12 4 58.8	1.09
12	10 10 53.84	0.209	12 5 15.3	1.07	12 8 47.3	10 10 52.01	0.205	12 5 24.6	1.05
13	10 10 48.90	0.201	12 5 40.5	1.03	13 8 43.3	10 10 47.15	0.198	12 5 49.4	1.01
14	10 10 44.15	0.194	12 6 4.7	0.99	14 8 39.3	10 10 42.48	0.191	12 6 13.2	0.97
15	10 10 39.57	0.186	12 6 27.9	0.94	15 8 35.3	10 10 37.98	0.184	12 6 35.9	0.92
16	10 10 35.18	0.179	12 6 50.0	0.90	16 8 31.3	10 10 33.67	0.176	12 6 57.5	0.88
17	10 10 30.98	0.171	12 7 11.0	0.85	17 8 27.3	10 10 29.55	0.168	12 7 18.1	0.84
18	10 10 26.98	0.163	12 7 31.0	0.81	18 8 23.3	10 10 25.62	0.160	12 7 37.7	0.79
19	10 10 23.15	0.155	12 7 49.8	0.76	19 8 19.3	10 10 21.87	0.152	12 7 56.1	0.75
20	10 10 19.52	0.147	12 8 7.6	0.72	20 8 15.3	10 10 18.32	0.144	12 8 13.5	0.70
21	10 10 16.08	0.139	12 8 24.3	0.67	21 8 11.3	10 10 14.96	0.136	12 8 29.8	0.65
22	10 10 12.84	0.131	12 8 39.9	0.63	22 8 7.3	10 10 11.79	0.128	12 8 44.9	0.61
23	10 10 9.80	0.123	12 8 54.4	0.58	23 8 3.3	10 10 8.82	0.120	12 8 59.0	0.56
24	10 10 6.95	0.114	12 9 7.8	0.53	24 7 59.4	10 10 6.04	0.111	12 9 12.0	0.52
25	10 10 4.29	0.106	12 9 20.0	0.49	25 7 55.4	10 10 3.46	0.103	12 9 23.8	0.46
26	10 10 1.84	0.097	12 9 31.1	0.44	26 7 51.5	10 10 1.08	0.095	12 9 34.5	0.42
27	10 9 59.59	0.089	12 9 41.1	0.39	27 7 47.5	10 9 58.90	0.086	12 9 44.1	0.38
28	10 9 57.53	0.081	12 9 50.0	0.35	28 7 43.5	10 9 56.92	0.077	12 9 52.6	0.33
29	10 9 55.69	0.072	12 9 57.7	0.30	29 7 39.5	10 9 55.14	0.069	12 10 0.0	0.28
30	10 9 54.04	0.064	12 10 4.3	0.25	30 7 35.6	10 9 53.56	0.061	12 10 6.2	0.23
31	10 9 52.60	-0.056	+12 10 9.8	+0.20	31 7 31.6	10 9 52.19	-0.053	+12 10 11.3	+0.19

Date.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.		Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
May 1	h m s	s	° ' "	"		d h m	h m s	s	° ' "	"
	10 9 52.60	-0.056	12 10 9.8	+0.20		1 7 31.6	10 9 52.19	-0.053	12 10 11.3	+0.19
	2 10 9 51.36	0.047	12 10 14.1	0.16		2 7 27.6	10 9 51.02	0.045	12 10 15.2	0.14
	3 10 9 50.33	0.039	12 10 17.3	0.11		3 7 23.7	10 9 50.05	0.036	12 10 18.1	0.09
	4 10 9 49.49	0.031	12 10 19.4	0.06		4 7 19.7	10 9 49.28	0.028	12 10 19.8	+0.05
	5 10 9 48.86	0.022	12 10 20.3	+0.01		5 7 15.8	10 9 48.71	0.019	12 10 20.3	0.00
	6 10 9 48.44	0.013	12 10 20.1	-0.03		6 7 11.9	10 9 48.35	0.011	12 10 19.8	-0.05
	7 10 9 48.22	-0.005	12 10 18.7	0.08		7 7 7.9	10 9 48.20	-0.002	12 10 18.1	0.09
	8 10 9 48.21	+0.004	12 10 16.2	0.13		8 7 4.0	10 9 48.25	+0.006	12 10 15.2	0.14
	9 10 9 48.40	0.012	12 10 12.6	0.17		9 7 0.1	10 9 48.50	0.015	12 10 11.3	0.19
	10 10 9 48.80	0.021	12 10 7.8	0.22		10 6 56.2	10 9 48.95	0.023	12 10 6.2	0.23
	11 10 9 49.40	0.030	12 10 1.9	0.27		11 6 52.2	10 9 49.61	0.032	12 10 0.0	0.28
	12 10 9 50.21	0.038	12 9 54.8	0.32		12 6 48.3	10 9 50.48	0.041	12 9 52.6	0.33
	13 10 9 51.22	0.047	12 9 46.6	0.37		13 6 44.4	10 9 51.54	0.049	12 9 44.1	0.38
	14 10 9 52.44	0.055	12 9 37.3	0.42		14 6 40.5	10 9 52.81	0.058	12 9 34.5	0.42
	15 10 9 53.86	0.063	12 9 26.8	0.46		15 6 36.6	10 9 54.29	0.066	12 9 23.7	0.47
	16 10 9 55.49	0.072	12 9 15.2	0.51		16 6 32.7	10 9 55.97	0.074	12 9 11.8	0.52
	17 10 9 57.33	0.080	12 9 2.5	0.56		17 6 28.8	10 9 57.86	0.083	12 8 58.8	0.57
	18 10 9 59.38	0.089	12 8 48.6	0.60		18 6 24.9	10 9 59.96	0.091	12 8 41.6	0.61
	19 10 10 1.62	0.097	12 8 33.5	0.65		19 6 21.0	10 10 2.25	0.099	12 8 29.3	0.66
	20 10 10 4.07	0.106	12 8 17.3	0.70		20 6 17.1	10 10 4.75	0.108	12 8 12.9	0.71
	21 10 10 6.73	0.115	12 8 0.0	0.74		21 6 13.2	10 10 7.45	0.116	12 7 55.4	0.75
	22 10 10 9.59	0.123	12 7 41.6	0.79		22 6 9.4	10 10 10.36	0.125	12 7 36.7	0.80
	23 10 10 12.65	0.132	12 7 22.1	0.84		23 6 5.5	10 10 13.46	0.134	12 7 17.0	0.84
	24 10 10 15.92	0.140	12 7 1.4	0.88		24 6 1.6	10 10 16.77	0.142	12 6 56.1	0.89
	25 10 10 19.39	0.149	12 6 39.7	0.93		25 5 57.7	10 10 20.28	0.150	12 6 34.1	0.94
	26 10 10 23.06	0.157	12 6 16.8	0.97		26 5 53.9	10 10 23.99	0.159	12 6 11.0	0.98
	27 10 10 26.92	0.165	12 5 52.8	1.02		27 5 50.0	10 10 27.89	0.167	12 5 46.8	1.03
	28 10 10 30.98	0.174	12 5 27.7	1.07		28 5 46.1	10 10 31.99	0.175	12 5 21.5	1.07
	29 10 10 35.24	0.182	12 5 1.5	1.11		29 5 42.3	10 10 36.29	0.183	12 4 55.2	1.12
	30 10 10 39.70	0.189	12 4 34.3	1.16		30 5 38.4	10 10 40.78	0.191	12 4 27.8	1.16
	31 10 10 44.35	0.197	12 4 6.0	1.20		31 5 34.5	10 10 45.46	0.199	12 3 59.3	1.21
June 1	10 10 49.20	0.205	12 3 36.6	1.25		1 5 30.7	10 10 50.34	0.207	12 3 29.8	1.25
	2 10 10 54.23	0.213	12 3 6.2	1.29		2 5 26.8	10 10 55.40	0.215	12 2 59.2	1.30
	3 10 10 59.46	0.221	12 2 34.7	1.33		3 5 23.0	10 11 0.66	0.223	12 2 27.5	1.34
	4 10 11 4.88	0.229	12 2 2.2	1.38		4 5 19.2	10 11 6.10	0.230	12 1 54.8	1.38
	5 10 11 10.48	0.237	12 1 28.7	1.42		5 5 15.3	10 11 11.73	0.238	12 1 21.1	1.42
	6 10 11 16.27	0.245	12 0 54.1	1.46		6 5 11.5	10 11 17.54	0.246	12 0 46.4	1.47
	7 10 11 22.25	0.253	12 0 18.5	1.51		7 5 7.7	10 11 23.55	0.254	12 0 10.7	1.51
	8 10 11 28.41	0.260	11 59 41.8	1.55		8 5 3.8	10 11 29.73	0.261	11 59 34.0	1.55
	9 10 11 34.75	0.268	11 59 4.2	1.59		9 5 0.0	10 11 36.09	0.269	11 58 56.2	1.59
	10 10 11 41.27	0.276	11 58 25.6	1.63		10 4 56.2	10 11 42.64	0.276	11 58 17.4	1.63
	11 10 11 47.98	0.283	11 57 46.0	1.67		11 4 52.4	10 11 49.36	0.284	11 57 37.7	1.67
	12 10 11 54.86	0.291	11 57 5.4	1.71		12 4 48.6	10 11 56.26	0.292	11 56 57.1	1.71
	13 10 12 1.92	0.298	11 56 23.7	1.75		13 4 44.7	10 12 3.34	0.299	11 56 15.4	1.76
	14 10 12 9.16	0.305	11 55 41.1	1.79		14 4 40.9	10 12 10.59	0.306	11 55 32.7	1.80
	15 10 12 16.57	0.312	11 54 57.6	1.83		15 4 37.1	10 12 18.02	0.313	11 54 49.1	1.84
	16 10 12 24.16	0.319	11 54 13.1	1.87		16 4 33.3	10 12 25.62	0.320	11 54 4.5	1.88
	17 10 12 31.92	0.326	11 53 27.6	1.91		17 4 29.5	10 12 33.39	0.327	11 53 19.0	1.92
	18 10 12 39.85	0.334	11 52 41.1	1.95		18 4 25.7	10 12 41.33	0.334	11 52 32.5	1.96
	19 10 12 47.95	0.341	11 51 53.8	1.99		19 4 21.9	10 12 49.43	0.341	11 51 45.1	2.00
	20 10 12 56.21	0.347	11 51 5.5	2.03		20 4 18.1	10 12 57.70	0.348	11 50 56.7	2.03
	21 10 13 4.64	0.354	11 50 16.3	2.07		21 4 14.3	10 13 6.14	0.355	11 50 7.5	2.07
	22 10 13 13.23	0.361	11 49 26.2	2.11		22 4 10.5	10 13 14.74	0.361	11 49 17.4	2.11
	23 10 13 21.98	0.368	11 48 35.2	2.14		23 4 6.7	10 13 23.49	0.368	11 48 26.3	2.15
	24 10 13 30.89	0.375	11 47 43.3	2.18		24 4 3.0	10 13 32.41	0.375	11 47 34.4	2.18
	25 10 13 39.96	0.381	11 46 50.5	2.21		25 3 59.2	10 13 41.47	0.381	11 46 41.7	2.21
	26 10 13 49.18	0.387	11 45 56.9	2.25		26 3 55.4	10 13 50.70	0.388	11 45 48.1	2.25
	27 10 13 58.55	0.393	11 45 2.5	2.29		27 3 51.6	10 14 0.07	0.394	11 44 53.6	2.29
	28 10 14 8.07	0.400	11 44 7.2	2.32		28 3 47.8	10 14 9.59	0.400	11 43 58.3	2.32
	29 10 14 17.74	0.406	11 43 11.1	2.35		29 3 44.1	10 14 19.25	0.406	11 43 2.2	2.35
	30 10 14 27.55	0.412	11 42 14.2	2.39		30 3 40.3	10 14 29.06	0.412	11 42 5.3	2.38
	31 10 14 37.50	+0.418	11 41 16.5	-2.42		31 3 36.5	10 14 39.02	+0.418	11 41 7.7	-2.42

Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
July 1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"
1	10 14 37.50	+0.418	11 41' 16.5	-2.42	1 3 36.5	10 14 39.02	+0.418	11 41' 7.7	-2.42
2	10 14 47.60	0.424	11 40' 18.0	2.45	2 3 32.8	10 14 49.10	0.424	11 40' 9.2	2.45
3	10 14 57.84	0.430	11 39' 18.7	2.48	3 3 29.0	10 14 59.33	0.430	11 39' 10.0	2.48
4	10 15 8.21	0.435	11 38' 18.6	2.52	4 3 25.3	10 15 9.70	0.435	11 38' 10.0	2.51
5	10 15 18.72	0.440	11 37' 17.8	2.55	5 3 21.5	10 15 20.20	0.440	11 37' 9.3	2.55
6	10 15 29.36	0.445	11 36' 16.3	2.58	6 3 17.7	10 15 30.83	0.445	11 36' 7.8	2.58
7	10 15 40.13	0.451	11 35' 14.0	2.61	7 3 14.0	10 15 41.59	0.451	11 35' 5.5	2.61
8	10 15 51.03	0.456	11 34' 11.0	2.64	8 3 10.2	10 15 52.48	0.456	11 34' 2.6	2.64
9	10 16 2.06	0.462	11 33' 7.2	2.67	9 3 6.5	10 16 3.50	0.461	11 32' 58.9	2.67
10	10 16 13.21	0.467	11 32' 2.8	2.70	10 3 2.7	10 16 14.64	0.466	11 31' 54.6	2.69
11	10 16 24.49	0.472	11 30' 57.7	2.73	11 2 59.0	10 16 25.90	0.471	11 30' 49.5	2.73
12	10 16 35.88	0.477	11 29' 51.9	2.76	12 2 55.3	10 16 37.27	0.476	11 29' 43.8	2.75
13	10 16 47.40	0.482	11 28' 45.3	2.79	13 2 51.5	10 16 48.77	0.481	11 28' 37.4	2.78
14	10 16 59.03	0.487	11 27' 38.2	2.81	14 2 47.8	10 17 0.39	0.486	11 27' 30.3	2.81
15	10 17 10.77	0.492	11 26' 30.4	2.84	15 2 44.1	10 17 12.12	0.491	11 26' 22.6	2.83
16	10 17 22.63	0.496	11 25' 21.9	2.87	16 2 40.3	10 17 23.96	0.495	11 25' 14.3	2.86
17	10 17 34.59	0.501	11 24' 12.8	2.89	17 2 36.6	10 17 35.90	0.500	11 24' 5.3	2.89
18	10 17 46.67	0.505	11 23' 3.2	2.92	18 2 32.9	10 17 47.95	0.504	11 22' 55.7	2.91
19	10 17 58.85	0.510	11 21' 52.9	2.94	19 2 29.1	10 18 0.11	0.509	11 21' 45.6	2.93
20	10 18 11.12	0.514	11 20' 42.0	2.96	20 2 25.4	10 18 12.37	0.513	11 20' 34.9	2.96
21	10 18 23.50	0.518	11 19' 30.6	2.99	21 2 21.7	10 18 24.73	0.517	11 19' 23.6	2.98
22	10 18 35.96	0.522	11 18' 18.6	3.01	22 2 18.0	10 18 37.18	0.521	11 18' 11.7	3.01
23	10 18 48.55	0.526	11 17' 6.1	3.03	23 2 14.2	10 18 49.72	0.525	11 16' 59.3	3.03
24	10 19 1.21	0.530	11 15' 53.1	3.05	24 2 10.5	10 19 2.36	0.529	11 15' 46.4	3.05
25	10 19 13.96	0.533	11 14' 39.5	3.07	25 2 6.8	10 19 15.09	0.532	11 14' 33.1	3.07
26	10 19 26.80	0.537	11 13' 25.5	3.10	26 2 3.1	10 19 27.90	0.536	11 13' 19.2	3.09
27	10 19 39.72	0.540	11 12' 11.0	3.11	27 1 59.3	10 19 40.79	0.539	11 12' 4.8	3.11
28	10 19 52.72	0.543	11 10' 56.0	3.13	28 1 55.6	10 19 53.76	0.542	11 10' 50.0	3.13
29	10 20 5.79	0.547	11 9' 40.6	3.15	29 1 51.9	10 20 6.81	0.545	11 9' 34.7	3.15
30	10 20 18.94	0.550	11 8' 24.7	3.17	30 1 48.2	10 20 19.93	0.549	11 8' 19.0	3.17
31	10 20 32.17	0.553	11 7' 8.4	3.19	31 1 44.5	10 20 33.13	0.552	11 7' 2.8	3.18
Aug. 1	10 20 45.47	0.556	11 5' 51.7	3.20	1 1 40.8	10 20 46.40	0.555	11 5' 46.3	3.19
2	10 20 58.83	0.559	11 4' 34.6	3.22	2 1 37.0	10 20 59.73	0.557	11 4' 29.4	3.21
3	10 21 12.26	0.561	11 3' 17.1	3.23	3 1 33.3	10 21 13.14	0.560	11 3' 12.1	3.23
4	10 21 25.76	0.563	11 1' 59.3	3.25	4 1 29.6	10 21 26.60	0.562	11 1' 54.4	3.24
5	10 21 39.32	0.566	11 0' 41.0	3.27	5 1 25.9	10 21 40.13	0.564	11 0' 36.4	3.26
6	10 21 52.94	0.568	10 59' 22.4	3.28	6 1 22.2	10 21 53.72	0.567	10 59' 18.0	3.27
7	10 22 6.61	0.570	10 58' 3.5	3.30	7 1 18.5	10 22 7.36	0.569	10 57' 59.2	3.29
8	10 22 20.34	0.572	10 56' 44.3	3.31	8 1 14.8	10 22 21.05	0.571	10 56' 40.1	3.30
9	10 22 34.12	0.574	10 55' 24.7	3.32	9 1 11.1	10 22 34.80	0.574	10 55' 20.8	3.31
10	10 22 47.95	0.576	10 54' 4.9	3.33	10 1 7.4	10 22 48.60	0.575	10 54' 1.1	3.32
11	10 23 1.83	0.578	10 52' 44.7	3.35	11 1 3.7	10 23 2.44	0.577	10 52' 41.2	3.34
12	10 23 15.75	0.580	10 51' 24.3	3.36	12 1 0.0	10 23 16.33	0.579	10 51' 20.9	3.35
13	10 23 29.72	0.582	10 50' 3.6	3.37	13 0 56.3	10 23 30.26	0.581	10 50' 0.4	3.36
14	10 23 43.72	0.584	10 48' 42.7	3.37	14 0 52.6	10 23 44.23	0.582	10 48' 39.7	3.37
15	10 23 57.76	0.585	10 47' 21.6	3.38	15 0 48.9	10 23 58.23	0.584	10 47' 18.8	3.37
16	10 24 11.83	0.587	10 46' 0.3	3.39	16 0 45.2	10 24 12.27	0.585	10 45' 57.7	3.38
17	10 24 25.94	0.588	10 44' 38.7	3.40	17 0 41.5	10 24 26.34	0.586	10 44' 36.4	3.39
18	10 24 40.07	0.589	10 43' 17.1	3.41	18 0 37.8	10 24 40.44	0.587	10 43' 14.9	3.40
19	10 24 54.22	0.590	10 41' 55.2	3.41	19 0 34.1	10 24 54.56	0.588	10 41' 53.3	3.40
20	10 25 8.40	0.591	10 40' 33.3	3.42	20 0 30.4	10 25 8.70	0.589	10 40' 31.5	3.41
21	10 25 22.60	0.592	10 39' 11.2	3.42	21 0 26.7	10 25 22.86	0.590	10 39' 9.7	3.41
22	10 25 36.81	0.592	10 37' 49.0	3.43	22 0 23.0	10 25 37.04	0.591	10 37' 47.7	3.42
23	10 25 51.04	0.593	10 36' 26.7	3.43	23 0 19.3	10 25 51.23	0.591	10 36' 25.6	3.42
24	10 26 5.28	0.593	10 35' 4.4	3.43	24 0 15.6	10 26 5.44	0.591	10 35' 3.5	3.42
25	10 26 19.53	0.593	10 33' 42.1	3.43	25 0 11.9	10 26 19.65	0.592	10 33' 41.4	3.43
26	10 26 33.79	0.594	10 32' 19.6	3.44	26 0 8.2	10 26 33.87	0.592	10 32' 19.1	3.43
27	10 26 48.04	0.594	10 30' 57.1	3.44	27 0 4.5	10 26 48.09	0.592	10 30' 56.9	3.43
28	10 27 2.30	0.594	10 29' 34.6	3.44	28 0 0.8	10 27 2.31	0.592	10 29' 34.6	3.43
					28 23 57.1	10 27 16.53	0.592	10 28' 12.4	3.43
29	10 27 16.55	0.593	10 28' 12.2	3.44	29 23 53.4	10 27 30.74	0.592	10 26' 50.1	3.43
30	10 27 30.80	0.593	10 26' 49.7	3.44	30 23 49.7	10 27 44.95	0.591	10 25' 27.9	3.43
31	10 27 45.05	+0.593	10 25' 27.3	-3.44	31 23 46.0	10 27 59.14	+0.591	10 24' 5.7	-3.42

Date. 1879.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff for 1 hour.	Apparent Declination.	Diff for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Sept. 1	h m s 10 27 59.28	+0.592	+10 24 4.9	-3.43	d h m 1 23 42.3	h m s 10 28 13.32	+0.590	+10 22 43.6	-3.42	
2	10 28 13.50	0.592	10 22 42.5	3.43	2 23 38.7	10 28 27.49	0.590	10 21 21.5	3.42	
3	10 28 27.70	0.591	10 21 20.3	3.42	3 23 35.0	10 28 41.65	0.589	10 19 59.6	3.41	
4	10 28 41.89	0.590	10 19 58.2	3.42	4 23 31.3	10 28 55.78	0.588	10 18 37.8	3.41	
5	10 28 56.06	0.589	10 18 36.1	3.42	5 23 27.6	10 29 9.89	0.587	10 17 16.0	3.40	
6	10 29 10.21	0.589	10 17 14.2	3.41	6 23 23.9	10 29 23.97	0.586	10 15 54.4	3.40	
7	10 29 24.33	0.588	10 15 52.4	3.41	7 23 20.2	10 29 38.03	0.585	10 14 33.0	3.39	
8	10 29 38.42	0.586	10 14 30.8	3.40	8 23 16.5	10 29 52.06	0.584	10 13 11.7	3.38	
9	10 29 52.49	0.585	10 13 9.3	3.39	9 23 12.8	10 30 6.06	0.582	10 11 50.6	3.37	
10	10 30 6.52	0.584	10 11 48.0	3.38	10 23 9.1	10 30 20.02	0.580	10 10 29.7	3.37	
11	10 30 20.52	0.582	10 10 26.8	3.37	11 23 5.4	10 30 33.95	0.579	10 9 9.0	3.36	
12	10 30 34.47	0.580	10 9 6.0	3.36	12 23 1.7	10 30 47.83	0.577	10 7 48.6	3.35	
13	10 30 48.39	0.578	10 7 45.3	3.35	13 22 58.0	10 31 1.67	0.575	10 6 28.4	3.34	
14	10 31 2.26	0.577	10 6 24.9	3.34	14 22 54.3	10 31 15.46	0.573	10 5 8.4	3.32	
15	10 31 16.09	0.575	10 5 4.8	3.33	15 22 50.6	10 31 29.20	0.571	10 3 48.8	3.31	
16	10 31 29.86	0.572	10 3 44.9	3.32	16 22 46.9	10 31 42.88	0.569	10 2 29.4	3.30	
17	10 31 43.58	0.570	10 2 25.4	3.31	17 22 43.2	10 31 56.51	0.566	10 1 10.5	3.29	
18	10 31 57.24	0.568	10 1 6.2	3.29	18 22 39.5	10 32 10.09	0.564	9 59 51.7	3.27	
19	10 32 10.85	0.565	9 59 47.4	3.28	19 22 35.8	10 32 23.60	0.561	9 58 33.4	3.25	
20	10 32 24.40	0.562	9 58 28.8	3.26	20 22 32.0	10 32 37.05	0.559	9 57 15.5	3.24	
21	10 32 37.88	0.560	9 57 10.7	3.25	21 22 28.3	10 32 50.43	0.557	9 55 57.9	3.22	
22	10 32 51.29	0.558	9 55 53.0	3.23	22 22 24.6	10 33 3.75	0.554	9 54 40.8	3.20	
23	10 33 4.63	0.555	9 54 35.7	3.21	23 22 20.9	10 33 16.99	0.550	9 53 24.1	3.19	
24	10 33 17.90	0.552	9 53 18.8	3.19	24 22 17.2	10 33 30.15	0.547	9 52 7.8	3.17	
25	10 33 31.09	0.549	9 52 2.3	3.18	25 22 13.5	10 33 43.24	0.544	9 50 51.9	3.15	
26	10 33 44.21	0.545	9 50 46.3	3.16	26 22 9.8	10 33 56.25	0.541	9 49 36.5	3.13	
27	10 33 57.25	0.542	9 49 30.8	3.14	27 22 6.1	10 34 9.18	0.537	9 48 21.7	3.11	
28	10 34 10.21	0.538	9 48 15.7	3.12	28 22 2.4	10 34 22.03	0.534	9 47 7.3	3.09	
29	10 34 23.08	0.534	9 47 1.2	3.10	29 21 58.6	10 34 34.78	0.530	9 45 53.4	3.07	
30	10 34 35.86	0.531	9 45 47.2	3.07	30 21 54.9	10 34 47.45	0.526	9 44 40.0	3.05	
Oct. 1	10 34 48.55	0.527	9 44 33.6	3.05	1 21 51.2	10 35 0.03	0.522	9 43 27.2	3.02	
2	10 35 1.15	0.523	9 43 20.7	3.03	2 21 47.5	10 35 12.51	0.518	9 42 14.9	3.00	
3	10 35 13.66	0.519	9 42 8.3	3.00	3 21 43.8	10 35 24.90	0.514	9 41 3.2	2.97	
4	10 35 26.07	0.515	9 40 56.4	2.98	4 21 40.0	10 35 37.19	0.510	9 39 52.1	2.95	
5	10 35 38.38	0.511	9 39 45.2	2.96	5 21 36.3	10 35 49.38	0.506	9 38 41.5	2.93	
6	10 35 50.59	0.507	9 38 34.5	2.93	6 21 32.6	10 36 1.46	0.501	9 37 31.6	2.90	
7	10 36 2.69	0.502	9 37 24.5	2.90	7 21 28.8	10 36 13.44	0.497	9 36 22.3	2.87	
8	10 36 14.69	0.497	9 36 15.1	2.88	8 21 25.1	10 36 25.31	0.492	9 35 13.7	2.84	
9	10 36 26.58	0.493	9 35 6.4	2.85	9 21 21.3	10 36 37.06	0.487	9 34 5.8	2.82	
10	10 36 38.35	0.489	9 33 58.3	2.82	10 21 17.6	10 36 48.70	0.482	9 32 58.5	2.79	
11	10 36 50.01	0.483	9 32 50.9	2.79	11 21 13.9	10 37 0.22	0.477	9 31 51.9	2.76	
12	10 37 1.55	0.478	9 31 44.3	2.76	12 21 10.1	10 37 11.63	0.472	9 30 46.1	2.73	
13	10 37 12.97	0.473	9 30 38.3	2.73	13 21 6.4	10 37 22.91	0.467	9 29 41.0	2.70	
14	10 37 24.27	0.468	9 29 33.1	2.70	14 21 2.6	10 37 34.07	0.462	9 28 36.5	2.67	
15	10 37 35.44	0.462	9 28 28.6	2.67	15 20 58.9	10 37 45.10	0.457	9 27 32.9	2.63	
16	10 37 46.48	0.457	9 27 25.0	2.64	16 20 55.1	10 37 56.00	0.451	9 26 30.1	2.60	
17	10 37 57.39	0.451	9 26 22.1	2.60	17 20 51.4	10 38 6.75	0.445	9 25 28.1	2.57	
18	10 38 8.16	0.445	9 25 20.0	2.57	18 20 47.6	10 38 17.39	0.439	9 24 26.9	2.53	
19	10 38 18.80	0.440	9 24 18.7	2.54	19 20 43.9	10 38 27.88	0.434	9 23 26.5	2.50	
20	10 38 29.30	0.435	9 23 18.3	2.50	20 20 40.1	10 38 38.24	0.429	9 22 26.9	2.46	
21	10 38 39.66	0.429	9 22 18.7	2.46	21 20 36.3	10 38 48.44	0.423	9 21 28.2	2.43	
22	10 38 49.88	0.423	9 21 20.0	2.43	22 20 32.6	10 38 58.50	0.417	9 20 30.4	2.39	
23	10 38 59.95	0.417	9 20 22.1	2.39	23 20 28.8	10 39 8.42	0.410	9 19 33.5	2.35	
24	10 39 9.87	0.410	9 19 25.2	2.35	24 20 25.0	10 39 18.19	0.404	9 18 37.4	2.32	
25	10 39 19.64	0.404	9 18 29.1	2.32	25 20 21.3	10 39 27.81	0.398	9 17 42.2	2.28	
26	10 39 29.26	0.398	9 17 33.9	2.28	26 20 17.5	10 39 37.28	0.391	9 16 48.0	2.24	
27	10 39 38.73	0.391	9 16 39.6	2.24	27 20 13.7	10 39 46.59	0.385	9 15 54.7	2.20	
28	10 39 48.04	0.385	9 15 46.4	2.20	28 20 9.9	10 39 55.74	0.378	9 15 2.3	2.16	
29	10 39 57.19	0.378	9 14 54.0	2.16	29 20 6.2	10 40 4.74	0.371	9 14 10.9	2.12	
30	10 40 6.19	0.371	9 14 2.7	2.12	30 20 2.4	10 40 13.57	0.365	9 13 20.5	2.08	
31	10 40 15.02	+0.364	+9 13 12.2	-2.08	31 19 58.6	10 40 22.24	+0.358	+9 12 31.0	-2.04	

Date.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
<b>1879.</b>									
<b>Nov. 1</b>	h m s 10 40 23.69	+ 0.357	9 12 22.8	- 2.04	d h m 1 19 54.8	h m s 10 40 30.75	+ 0.351	9 11 42.6	- 2.00
2	10 40 32.19	0.350	9 11 34.4	2.00	2 19 51.0	10 40 39.09	0.344	9 10 55.2	1.96
3	10 40 40.52	0.343	9 10 47.0	1.95	3 19 47.2	10 40 47.27	0.337	9 10 8.7	1.92
4	10 40 48.69	0.336	9 10 0.5	1.91	4 19 43.4	10 40 55.27	0.329	9 9 23.3	1.87
5	10 40 56.68	0.329	9 9 15.3	1.87	5 19 39.6	10 41 3.10	0.322	9 8 38.9	1.83
6	10 41 4.50	0.322	9 8 31.0	1.82	6 19 35.8	10 41 10.76	0.315	9 7 55.6	1.78
7	10 41 12.14	0.315	9 7 47.8	1.78	7 19 32.0	10 41 18.23	0.308	9 7 13.4	1.74
8	10 41 19.61	0.308	9 7 5.6	1.73	8 19 28.2	10 41 25.53	0.301	9 6 32.2	1.69
9	10 41 26.89	0.300	9 6 24.6	1.69	9 19 24.4	10 41 32.65	0.293	9 5 52.2	1.65
10	10 41 33.99	0.292	9 5 44.6	1.64	10 19 20.5	10 41 39.58	0.285	9 5 13.2	1.60
11	10 41 40.91	0.284	9 5 5.8	1.59	11 19 16.7	10 41 46.33	0.278	9 4 35.4	1.55
12	10 41 47.64	0.277	9 4 28.1	1.55	12 19 12.9	10 41 52.90	0.270	9 3 58.7	1.51
13	10 41 54.19	0.269	9 3 51.5	1.50	13 19 9.1	10 41 59.28	0.262	9 3 23.1	1.46
14	10 42 0.55	0.261	9 3 16.1	1.45	14 19 5.2	10 42 5.46	0.254	9 2 48.7	1.41
15	10 42 6.71	0.253	9 2 41.8	1.40	15 19 1.4	10 42 11.45	0.245	9 2 15.5	1.36
16	10 42 12.68	0.244	9 2 8.7	1.35	16 18 57.6	10 42 17.25	0.237	9 1 43.4	1.31
17	10 42 18.45	0.236	9 1 36.8	1.30	17 18 53.7	10 42 22.86	0.229	9 1 12.5	1.26
18	10 42 24.03	0.228	9 1 6.1	1.26	18 18 49.9	10 42 28.27	0.221	9 0 42.8	1.21
19	10 42 29.42	0.220	9 0 36.5	1.21	19 18 46.0	10 42 33.49	0.213	9 0 14.3	1.16
20	10 42 34.60	0.211	9 0 8.2	1.15	20 18 42.2	10 42 38.50	0.204	8 59 47.0	1.11
21	10 42 39.59	0.203	8 59 41.1	1.10	21 18 38.3	10 42 43.32	0.196	8 59 20.8	1.06
22	10 42 44.37	0.195	8 59 15.2	1.05	22 18 34.5	10 42 47.94	0.188	8 58 55.9	1.01
23	10 42 48.96	0.186	8 58 50.5	1.00	23 18 30.6	10 42 52.36	0.180	8 58 32.2	0.96
24	10 42 53.34	0.178	8 58 27.0	0.95	24 18 26.8	10 42 56.57	0.172	8 58 9.7	0.91
25	10 42 57.52	0.170	8 58 4.7	0.90	25 18 22.9	10 43 0.58	0.163	8 57 48.5	0.86
26	10 43 1.49	0.161	8 57 43.7	0.85	26 18 19.0	10 43 4.39	0.154	8 57 28.4	0.81
27	10 43 5.26	0.153	8 57 23.9	0.80	27 18 15.2	10 43 7.99	0.146	8 57 9.6	0.76
28	10 43 8.83	0.144	8 57 5.3	0.75	28 18 11.3	10 43 11.39	0.138	8 56 52.0	0.71
29	10 43 12.19	0.136	8 56 48.0	0.69	29 18 7.4	10 43 14.59	0.129	8 56 35.7	0.65
30	10 43 15.34	0.127	8 56 31.9	0.65	30 18 3.5	10 43 17.57	0.120	8 56 20.7	0.60
<b>Dec. 1</b>	10 43 18.28	0.118	8 56 17.1	0.59	1 17 59.6	10 43 20.35	0.111	8 56 6.8	0.55
2	10 43 21.01	0.109	8 56 3.5	0.54	2 17 55.8	10 43 22.92	0.102	8 55 54.2	0.50
3	10 43 23.54	0.100	8 55 51.2	0.49	3 17 51.9	10 43 25.28	0.094	8 55 42.9	0.44
4	10 43 25.85	0.092	8 55 40.2	0.43	4 17 48.0	10 43 27.43	0.085	8 55 32.9	0.39
5	10 43 27.95	0.083	8 55 30.5	0.38	5 17 44.1	10 43 29.37	0.076	8 55 24.1	0.34
6	10 43 29.84	0.074	8 55 22.1	0.33	6 17 40.2	10 43 31.10	0.067	8 55 16.6	0.29
7	10 43 31.52	0.065	8 55 14.9	0.27	7 17 36.3	10 43 32.62	0.059	8 55 10.4	0.23
8	10 43 32.99	0.057	8 55 9.0	0.22	8 17 32.4	10 43 33.92	0.050	8 55 5.4	0.18
9	10 43 34.24	0.048	8 55 4.3	0.17	9 17 28.4	10 43 35.01	0.041	8 55 1.7	0.13
10	10 43 35.28	0.039	8 55 1.0	0.11	10 17 24.5	10 43 35.89	0.033	8 54 59.3	0.07
11	10 43 36.10	0.030	8 54 59.0	- 0.01	11 17 20.6	10 43 36.56	0.024	8 54 58.2	- 0.02
12	10 43 36.71	0.021	8 54 58.2	0.00	12 17 16.7	10 43 37.02	0.015	8 54 58.4	+ 0.03
13	10 43 37.11	0.012	8 54 58.7	+ 0.05	13 17 12.8	10 43 37.26	+ 0.006	8 54 59.8	0.08
14	10 43 37.29	+ 0.003	8 55 0.5	0.10	14 17 8.8	10 43 37.29	- 0.003	8 55 2.5	0.14
15	10 43 37.26	- 0.006	8 55 3.5	0.15	15 17 4.9	10 43 37.11	0.012	8 55 6.5	0.19
16	10 43 37.02	0.015	8 55 7.9	0.21	16 17 0.9	10 43 36.72	0.021	8 55 11.7	0.24
17	10 43 36.56	0.024	8 55 13.5	0.26	17 16 57.0	10 43 36.12	0.030	8 55 18.2	0.30
18	10 43 35.90	0.033	8 55 20.4	0.31	18 16 53.1	10 43 35.30	0.039	8 55 25.9	0.35
19	10 43 35.01	0.041	8 55 28.5	0.36	19 16 49.1	10 43 34.27	0.048	8 55 35.0	0.40
20	10 43 33.92	0.050	8 55 37.9	0.42	20 16 45.2	10 43 33.04	0.056	8 55 45.2	0.45
21	10 43 32.62	0.059	8 55 48.6	0.47	21 16 41.2	10 43 31.60	0.064	8 55 56.7	0.50
22	10 43 31.12	0.067	8 56 0.5	0.52	22 16 37.2	10 43 29.95	0.073	8 56 9.4	0.55
23	10 43 29.40	0.075	8 56 13.6	0.57	23 16 33.3	10 43 28.09	0.081	8 56 23.3	0.61
24	10 43 27.47	0.084	8 56 27.9	0.62	24 16 29.3	10 43 26.03	0.090	8 56 38.5	0.66
25	10 43 25.34	0.093	8 56 43.5	0.67	25 16 25.3	10 43 23.77	0.098	8 56 54.8	0.71
26	10 43 23.01	0.101	8 57 0.3	0.72	26 16 21.4	10 43 21.31	0.107	8 57 12.4	0.76
27	10 43 20.48	0.109	8 57 18.2	0.77	27 16 17.4	10 43 18.64	0.115	8 57 31.1	0.80
28	10 43 17.74	0.118	8 57 37.4	0.82	28 16 13.4	10 43 15.77	0.124	8 57 51.0	0.85
29	10 43 14.80	0.127	8 57 67.8	0.87	29 16 9.5	10 43 12.70	0.132	8 58 12.1	0.90
30	10 43 11.66	0.135	8 58 19.3	0.92	30 16 5.5	10 43 9.44	0.140	8 58 34.4	0.95
31	10 43 8.32	0.143	8 58 42.0	0.97	31 16 1.5	10 43 5.98	0.148	8 58 57.8	1.00
32	10 43 4.79	- 0.151	8 59 5.9	+ 1.02	32 15 57.5	10 43 2.33	- 0.156	8 59 22.4	+ 1.05

Date.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT,				
1879.	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Jan. 0	h m s 2 21 22.77	-0.094	12 10 42.5	-0.32	d h m 0 7 40.1	2 21 22.06	-0.092	12 10 40.1	-0.31
1	2 21 20.58	0.089	12 10 35.1	0.30	1 7 36.2	2 21 19.91	0.087	12 10 32.9	0.29
2	2 21 18.52	0.084	12 10 28.3	0.27	2 7 32.2	2 21 17.89	0.081	12 10 26.3	0.26
3	2 21 16.58	0.078	12 10 22.1	0.24	3 7 28.3	2 21 16.00	0.076	12 10 20.4	0.23
4	2 21 14.77	0.073	12 10 16.8	0.21	4 7 24.3	2 21 14.24	0.071	12 10 15.2	0.20
5	2 21 13.09	0.068	12 10 12.0	0.19	5 7 20.4	2 21 12.60	0.066	12 10 10.7	0.18
6	2 21 11.53	0.062	12 10 7.9	0.16	6 7 16.4	2 21 11.08	0.061	12 10 6.8	0.15
7	2 21 10.10	0.057	12 10 4.4	0.13	7 7 12.4	2 21 9.69	0.055	12 10 3.5	0.12
8	2 21 8.80	0.052	12 10 1.6	0.10	8 7 8.5	2 21 8.43	0.050	12 10 0.9	0.09
9	2 21 7.62	0.047	12 9 59.5	0.07	9 7 4.5	2 21 7.29	0.045	12 9 59.0	0.07
10	2 21 6.57	0.041	12 9 58.1	0.04	10 7 0.6	2 21 6.29	0.039	12 9 57.8	0.04
11	2 21 5.66	0.035	12 9 57.4	-0.02	11 6 56.6	2 21 5.42	0.033	12 9 57.3	-0.01
12	2 21 4.89	0.030	12 9 57.3	+0.01	12 6 52.7	2 21 4.69	0.028	12 9 57.4	+0.02
13	2 21 4.25	0.024	12 9 58.0	0.04	13 6 48.7	2 21 4.09	0.022	12 9 58.3	0.05
14	2 21 3.75	0.018	12 9 59.4	0.07	14 6 44.8	2 21 3.63	0.016	12 9 59.9	0.08
15	2 21 3.38	0.013	12 10 1.4	0.10	15 6 40.8	2 21 3.30	0.011	12 10 2.1	0.11
16	2 21 3.14	0.007	12 10 4.1	0.13	16 6 36.9	2 21 3.10	-0.006	12 10 5.0	0.14
17	2 21 3.04	-0.001	12 10 7.5	0.16	17 6 33.0	2 21 3.03	0.000	12 10 8.6	0.16
18	2 21 3.07	+0.004	12 10 11.6	0.18	18 6 29.1	2 21 3.10	+0.006	12 10 12.8	0.19
19	2 21 3.23	0.010	12 10 16.3	0.21	19 6 25.1	2 21 3.30	0.011	12 10 17.7	0.22
20	2 21 3.53	0.016	12 10 21.8	0.24	20 6 21.2	2 21 3.64	0.017	12 10 23.3	0.25
21	2 21 3.98	0.022	12 10 28.0	0.27	21 6 17.3	2 21 4.12	0.023	12 10 29.7	0.28
22	2 21 4.56	0.027	12 10 34.9	0.30	22 6 13.4	2 21 4.73	0.028	12 10 36.8	0.31
23	2 21 5.27	0.032	12 10 42.4	0.33	23 6 9.4	2 21 5.47	0.034	12 10 44.5	0.33
24	2 21 6.11	0.038	12 10 50.6	0.36	24 6 5.5	2 21 6.35	0.039	12 10 52.8	0.36
25	2 21 7.09	0.044	12 10 59.5	0.38	25 6 1.6	2 21 7.36	0.045	12 11 1.8	0.39
26	2 21 8.20	0.049	12 11 9.0	0.41	26 5 57.7	2 21 8.50	0.050	12 11 11.5	0.42
27	2 21 9.45	0.055	12 11 19.2	0.44	27 5 53.8	2 21 9.78	0.056	12 11 21.9	0.45
28	2 21 10.84	0.061	12 11 30.2	0.47	28 5 49.9	2 21 11.19	0.062	12 11 33.0	0.48
29	2 21 12.36	0.066	12 11 41.8	0.50	29 5 46.0	2 21 12.74	0.067	12 11 44.7	0.50
30	2 21 14.01	0.072	12 11 54.0	0.52	30 5 42.1	2 21 14.42	0.073	12 11 57.0	0.53
31	2 21 15.80	0.077	12 12 6.9	0.55	31 5 38.2	2 21 16.24	0.078	12 12 10.0	0.56
Feb. 1	2 21 17.72	0.083	12 12 20.5	0.58	1 5 34.3	2 21 18.19	0.084	12 12 23.7	0.59
2	2 21 19.78	0.089	12 12 34.8	0.61	2 5 30.4	2 21 20.27	0.089	12 12 38.1	0.62
3	2 21 21.97	0.094	12 12 49.7	0.63	3 5 26.5	2 21 22.48	0.095	12 12 53.2	0.64
4	2 21 24.29	0.099	12 13 5.2	0.66	4 5 22.6	2 21 24.83	0.100	12 13 8.8	0.66
5	2 21 26.74	0.105	12 13 21.3	0.69	5 5 18.7	2 21 27.30	0.105	12 13 25.0	0.69
6	2 21 29.31	0.110	12 13 38.1	0.72	6 5 14.8	2 21 29.89	0.110	12 13 41.9	0.72
7	2 21 32.01	0.115	12 13 55.6	0.74	7 5 10.9	2 21 32.61	0.116	12 13 59.5	0.75
8	2 21 34.85	0.121	12 14 13.7	0.77	8 5 7.0	2 21 35.47	0.122	12 14 17.7	0.77
9	2 21 37.82	0.126	12 14 32.4	0.79	9 5 3.1	2 21 38.46	0.127	12 14 36.5	0.80
10	2 21 40.92	0.131	12 14 51.8	0.82	10 4 59.2	2 21 41.58	0.132	12 14 55.9	0.82
11	2 21 44.14	0.137	12 15 11.8	0.84	11 4 55.4	2 21 44.82	0.138	12 15 15.9	0.85
12	2 21 47.49	0.142	12 15 32.3	0.87	12 4 51.5	2 21 48.18	0.143	12 15 36.5	0.87
13	2 21 50.96	0.147	12 15 53.4	0.89	13 4 47.6	2 21 51.67	0.148	12 15 57.7	0.90
14	2 21 54.56	0.153	12 16 15.2	0.92	14 4 43.8	2 21 55.28	0.153	12 16 19.5	0.92
15	2 21 58.28	0.158	12 16 37.5	0.94	15 4 39.9	2 21 59.02	0.159	12 16 41.9	0.95
16	2 22 2.13	0.163	12 17 0.4	0.97	16 4 36.0	2 22 2.88	0.163	12 17 4.9	0.97
17	2 22 6.10	0.168	12 17 23.9	0.99	17 4 32.2	2 22 6.86	0.168	12 17 28.5	0.99
18	2 22 10.18	0.173	12 17 48.0	1.02	18 4 28.3	2 22 10.96	0.173	12 17 52.6	1.02
19	2 22 14.38	0.178	12 18 12.7	1.04	19 4 24.4	2 22 15.17	0.178	12 18 17.3	1.04
20	2 22 18.70	0.183	12 18 37.9	1.07	20 4 20.5	2 22 19.50	0.183	12 18 42.6	1.06
21	2 22 23.15	0.188	12 19 3.9	1.09	21 4 16.7	2 22 23.95	0.188	12 19 8.4	1.08
22	2 22 27.71	0.193	12 19 30.1	1.11	22 4 12.8	2 22 28.52	0.193	12 19 34.8	1.11
23	2 22 32.39	0.197	12 19 57.0	1.13	23 4 9.0	2 22 33.21	0.198	12 20 1.7	1.13
24	2 22 37.18	0.202	12 20 24.4	1.15	24 4 5.1	2 22 38.01	0.202	12 20 29.1	1.15
25	2 22 42.09	0.206	12 20 52.3	1.17	25 4 1.3	2 22 42.92	0.207	12 20 57.0	1.17
26	2 22 47.09	0.211	12 21 20.7	1.19	26 3 57.4	2 22 47.93	0.211	12 21 25.4	1.19
27	2 22 52.21	0.216	12 21 49.6	1.21	27 3 53.6	2 22 53.05	0.216	12 21 54.3	1.21
28	2 22 57.44	0.220	12 22 19.0	1.24	28 3 49.8	2 22 58.28	0.220	12 22 23.7	1.24
29	2 23 2.78	0.225	12 22 48.9	1.26	29 3 45.9	2 23 3.63	0.225	12 22 53.6	1.26
30	2 23 8.23	+0.229	12 23 19.3	+1.28	30 3 42.1	2 23 9.08	+0.229	12 23 24.0	+1.28

Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	2 23 2.78	+0.225	12 22 48.9	+1.26	1 3 45.9	2 23 3.63	+0.225	12 22 53.6	+1.26
2	2 23 8.23	0.229	12 23 19.3	1.28	2 3 42.1	2 23 9.08	0.229	12 23 24.0	1.28
3	2 23 13.79	0.234	12 23 50.1	1.30	3 3 38.2	2 23 14.64	0.234	12 23 54.8	1.30
4	2 23 19.45	0.238	12 24 21.5	1.32	4 3 34.4	2 23 20.30	0.238	12 24 26.2	1.32
5	2 23 25.21	0.242	12 24 53.4	1.34	5 3 30.6	2 23 26.06	0.242	12 24 58.1	1.34
6	2 23 31.07	0.246	12 25 25.7	1.36	6 3 26.7	2 23 31.92	0.246	12 25 30.4	1.35
7	2 23 37.03	0.250	12 25 58.5	1.38	7 3 22.9	2 23 37.88	0.250	12 26 3.1	1.37
8	2 23 43.09	0.255	12 26 31.7	1.39	8 3 19.1	2 23 43.94	0.254	12 26 36.3	1.39
9	2 23 49.25	0.258	12 27 5.3	1.41	9 3 15.2	2 23 50.09	0.258	12 27 9.9	1.41
10	2 23 55.50	0.262	12 27 39.3	1.43	10 3 11.4	2 23 56.34	0.262	12 27 43.9	1.42
11	2 24 1.84	0.266	12 28 13.7	1.44	11 3 7.6	2 24 2.68	0.266	12 28 18.2	1.44
12	2 24 8.28	0.270	12 28 48.5	1.46	12 3 3.8	2 24 9.11	0.270	12 28 53.0	1.46
13	2 24 14.81	0.274	12 29 23.8	1.48	13 2 59.9	2 24 15.63	0.274	12 29 28.2	1.47
14	2 24 21.43	0.278	12 29 59.4	1.49	14 2 56.1	2 24 22.24	0.277	12 30 3.8	1.49
15	2 24 28.13	0.281	12 30 35.4	1.51	15 2 52.3	2 24 28.94	0.281	12 30 39.7	1.50
16	2 24 34.92	0.285	12 31 11.7	1.52	16 2 48.5	2 24 35.72	0.284	12 31 16.0	1.52
17	2 24 41.80	0.288	12 31 48.4	1.54	17 2 44.7	2 24 42.59	0.288	12 31 52.6	1.53
18	2 24 48.76	0.292	12 32 25.4	1.55	18 2 40.8	2 24 49.54	0.291	12 32 29.6	1.55
19	2 24 55.80	0.295	12 33 2.8	1.56	19 2 37.0	2 24 56.57	0.295	12 33 6.9	1.56
20	2 25 2.92	0.298	12 33 40.5	1.58	20 2 33.2	2 25 3.68	0.298	12 33 44.5	1.57
21	2 25 10.11	0.301	12 34 18.5	1.59	21 2 29.4	2 25 10.86	0.301	12 34 22.5	1.59
22	2 25 17.38	0.305	12 34 56.8	1.60	22 2 25.6	2 25 18.12	0.304	12 35 0.7	1.60
23	2 25 24.73	0.308	12 35 35.4	1.62	23 2 21.8	2 25 25.46	0.307	12 35 39.2	1.61
24	2 25 32.15	0.311	12 36 14.4	1.63	24 2 18.0	2 25 32.87	0.310	12 36 18.1	1.63
25	2 25 39.64	0.313	12 36 53.6	1.64	25 2 14.2	2 25 40.34	0.313	12 36 57.2	1.64
26	2 25 47.19	0.316	12 37 33.0	1.65	26 2 10.3	2 25 47.88	0.316	12 37 36.6	1.65
27	2 25 54.81	0.319	12 38 12.7	1.66	27 2 6.5	2 25 55.49	0.318	12 38 16.2	1.66
28	2 26 2.50	0.322	12 38 52.7	1.67	28 2 2.7	2 26 3.16	0.321	12 38 56.1	1.67
29	2 26 10.25	0.324	12 39 32.9	1.68	29 1 58.9	2 26 10.89	0.324	12 39 36.2	1.67
30	2 26 18.06	0.327	12 40 13.3	1.69	30 1 55.1	2 26 18.69	0.326	12 40 16.5	1.68
31	2 26 25.93	0.329	12 40 53.9	1.70	31 1 51.3	2 26 26.51	0.328	12 40 57.0	1.69
Apr. 1	2 26 33.86	0.332	12 41 34.7	1.70	1 1 47.5	2 26 34.45	0.331	12 41 37.8	1.70
2	2 26 41.85	0.334	12 42 15.8	1.71	2 1 43.7	2 26 42.42	0.333	12 42 18.2	1.71
3	2 26 49.89	0.336	12 42 57.1	1.72	3 1 40.0	2 26 50.45	0.335	12 43 0.0	1.72
4	2 26 57.98	0.338	12 43 38.6	1.73	4 1 36.1	2 26 58.52	0.337	12 43 41.4	1.73
5	2 27 6.12	0.340	12 44 20.2	1.74	5 1 32.3	2 27 6.64	0.340	12 44 22.9	1.73
6	2 27 14.31	0.342	12 45 2.0	1.74	6 1 28.5	2 27 14.82	0.342	12 45 4.6	1.74
7	2 27 22.55	0.344	12 45 43.9	1.75	7 1 24.7	2 27 23.04	0.344	12 45 46.4	1.75
8	2 27 30.84	0.346	12 46 26.0	1.76	8 1 21.0	2 27 31.31	0.345	12 46 28.4	1.75
9	2 27 39.17	0.348	12 47 8.2	1.76	9 1 17.2	2 27 39.62	0.347	12 47 10.5	1.76
10	2 27 47.54	0.350	12 47 50.5	1.76	10 1 13.4	2 27 47.97	0.349	12 47 52.7	1.76
11	2 27 55.95	0.351	12 48 32.9	1.77	11 1 9.6	2 27 56.36	0.350	12 48 35.0	1.76
12	2 28 4.39	0.353	12 49 15.4	1.77	12 1 5.8	2 28 4.78	0.352	12 49 17.4	1.77
13	2 28 12.87	0.354	12 49 58.1	1.78	13 1 2.0	2 28 13.24	0.353	12 49 59.9	1.78
14	2 28 21.39	0.356	12 50 40.9	1.78	14 0 58.2	2 28 21.73	0.355	12 50 42.6	1.78
15	2 28 29.94	0.357	12 51 23.7	1.79	15 0 54.4	2 28 30.26	0.356	12 51 25.3	1.78
16	2 28 38.52	0.358	12 52 6.6	1.79	16 0 50.6	2 28 38.82	0.357	12 52 8.1	1.78
17	2 28 47.13	0.359	12 52 49.5	1.79	17 0 46.8	2 28 47.41	0.359	12 52 50.9	1.79
18	2 28 55.77	0.360	12 53 32.5	1.79	18 0 43.0	2 28 56.03	0.360	12 53 33.8	1.79
19	2 29 4.43	0.361	12 54 15.5	1.79	19 0 39.3	2 29 4.67	0.360	12 54 16.7	1.79
20	2 29 13.11	0.362	12 54 58.5	1.79	20 0 35.5	2 29 13.32	0.361	12 54 59.6	1.79
21	2 29 21.81	0.363	12 55 41.5	1.79	21 0 31.7	2 29 22.00	0.362	12 55 42.5	1.79
22	2 29 30.53	0.364	12 56 24.5	1.80	22 0 27.9	2 29 30.70	0.363	12 56 25.4	1.79
23	2 29 39.27	0.365	12 57 7.6	1.80	23 0 24.1	2 29 39.42	0.364	12 57 8.3	1.79
24	2 29 48.03	0.365	12 57 50.6	1.80	24 0 20.3	2 29 48.15	0.364	12 57 51.2	1.79
25	2 29 56.80	0.365	12 58 33.7	1.79	25 0 16.5	2 29 56.90	0.365	12 58 34.1	1.79
26	2 30 5.57	0.366	12 59 16.6	1.79	26 0 12.7	2 30 5.65	0.365	12 59 17.0	1.79
27	2 30 14.35	0.366	12 59 59.6	1.79	27 0 8.9	2 30 14.41	0.365	12 59 59.9	1.79
28	2 30 23.15	0.367	13 0 42.5	1.79	28 0 5.2	2 30 23.18	0.365	13 0 42.7	1.78
29	2 30 31.95	0.367	13 1 25.3	1.78	29 0 1.4	2 30 31.95	0.366	13 1 25.4	1.78
30	2 30 40.75	0.367	13 2 8.0	1.78	30 23 57.5	2 30 40.73	0.366	13 2 9.0	1.77
31	2 30 49.55	+0.367	+13 2 50.7	+1.78	31 23 53.7	2 30 49.51	0.366	13 2 50.5	1.77
						2 30 58.29	+0.366	+13 3 33.0	+1.77



Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
May	1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"
	2	2 30 49.55	+0.367	+13 2 50.7	+1.78	1 23 49.9	2 30 58.29	+0.366	+13 3 33.0	+1.77
	3	2 30 58.35	0.367	13 3 33.3	1.77	2 23 46.1	2 31 7.07	0.366	13 4 15.4	1.76
	4	2 31 7.16	0.367	13 4 15.8	1.77	3 23 42.3	2 31 15.85	0.366	13 4 57.7	1.76
	5	2 31 15.96	0.366	13 4 58.2	1.76	4 23 38.5	2 31 24.62	0.365	13 5 39.9	1.76
	6	2 31 24.75	0.366	13 5 40.5	1.76	5 23 34.7	2 31 33.38	0.365	13 6 22.0	1.75
	7	2 31 33.53	0.366	13 6 22.7	1.75	6 23 30.9	2 31 42.12	0.364	13 7 3.9	1.74
	8	2 31 42.30	0.365	13 7 4.7	1.74	7 23 27.2	2 31 50.86	0.364	13 7 45.6	1.74
	9	2 31 51.06	0.365	13 7 46.6	1.74	8 23 23.4	2 31 59.59	0.363	13 8 27.2	1.73
	10	2 31 59.81	0.364	13 8 28.3	1.73	9 23 19.6	2 32 8.30	0.363	13 9 8.6	1.72
	11	2 32 8.54	0.363	13 9 9.8	1.73	10 23 15.8	2 32 16.99	0.362	13 9 49.9	1.72
	12	2 32 17.25	0.363	13 9 51.2	1.72	11 23 12.0	2 32 25.66	0.361	13 10 31.0	1.71
	13	2 32 25.95	0.362	13 10 32.4	1.71	12 23 8.1	2 32 34.31	0.360	13 11 12.0	1.70
	14	2 32 34.62	0.361	13 11 13.5	1.71	13 23 4.4	2 32 42.93	0.359	13 11 52.8	1.70
	15	2 32 43.27	0.360	13 11 54.4	1.70	14 23 0.7	2 32 51.53	0.358	13 12 33.4	1.69
	16	2 32 51.89	0.359	13 12 35.1	1.69	15 22 56.9	2 33 0.11	0.357	13 13 13.8	1.68
	17	2 33 0.49	0.358	13 13 15.6	1.68	16 22 53.1	2 33 8.66	0.356	13 13 53.9	1.67
	18	2 33 9.06	0.356	13 13 55.8	1.67	17 22 49.3	2 33 17.18	0.354	13 14 33.8	1.66
	19	2 33 17.60	0.355	13 14 35.8	1.66	18 22 45.5	2 33 25.67	0.353	13 15 13.6	1.65
	20	2 33 26.11	0.354	13 15 15.6	1.65	19 22 41.7	2 33 34.12	0.351	13 15 53.1	1.64
	21	2 33 34.58	0.352	13 15 55.2	1.64	20 22 37.9	2 33 42.54	0.350	13 16 32.3	1.63
	22	2 33 43.02	0.351	13 16 34.5	1.63	21 22 34.2	2 33 50.92	0.348	13 17 11.2	1.61
	23	2 33 51.43	0.349	13 17 13.5	1.62	22 22 30.4	2 33 59.26	0.347	13 17 49.8	1.60
	24	2 33 59.79	0.347	13 17 52.3	1.61	23 22 26.6	2 34 7.56	0.345	13 18 28.2	1.60
	25	2 34 8.10	0.346	13 18 30.8	1.60	24 22 22.8	2 34 15.82	0.343	13 19 6.4	1.59
	26	2 34 16.58	0.344	13 19 9.0	1.59	25 22 19.0	2 34 24.03	0.341	13 19 44.3	1.57
	27	2 34 24.61	0.342	13 19 46.9	1.57	26 22 15.2	2 34 32.20	0.339	13 20 21.9	1.56
	28	2 34 32.79	0.340	13 20 24.6	1.56	27 22 11.4	2 34 40.32	0.337	13 20 59.1	1.54
	29	2 34 40.93	0.338	13 21 1.9	1.55	28 22 7.6	2 34 48.39	0.335	13 21 36.0	1.53
	30	2 34 49.02	0.336	13 21 39.9	1.54	29 22 3.8	2 34 56.41	0.333	13 22 12.6	1.52
	31	2 34 57.06	0.334	13 22 15.6	1.52	30 22 0.0	2 35 4.38	0.331	13 22 48.9	1.51
June	1	2 35 5.04	0.332	13 22 51.9	1.51	31 21 56.2	2 35 12.29	0.328	13 23 24.9	1.49
	2	2 35 12.97	0.329	13 23 27.9	1.49	1 21 52.4	2 35 20.14	0.326	13 24 0.5	1.48
	3	2 35 21.84	0.327	13 24 3.6	1.48	2 21 48.6	2 35 27.94	0.324	13 24 35.8	1.46
	4	2 35 28.65	0.324	13 24 31.0	1.46	3 21 44.8	2 35 35.68	0.321	13 25 10.7	1.45
	5	2 35 36.40	0.322	13 25 14.0	1.45	4 21 41.0	2 35 43.36	0.319	13 25 45.2	1.43
	6	2 35 44.09	0.319	13 25 48.5	1.43	5 21 37.2	2 35 50.97	0.316	13 26 19.2	1.41
	7	2 35 51.72	0.316	13 26 22.6	1.41	6 21 33.4	2 35 58.52	0.313	13 26 52.9	1.40
	8	2 35 59.28	0.314	13 26 56.4	1.40	7 21 29.6	2 36 6.00	0.310	13 27 26.4	1.39
	9	2 36 6.78	0.311	13 27 29.9	1.39	8 21 25.8	2 36 13.42	0.307	13 27 59.5	1.37
	10	2 36 14.21	0.308	13 28 3.1	1.37	9 21 22.0	2 36 20.77	0.304	13 28 32.2	1.35
	11	2 36 21.57	0.305	13 28 35.8	1.35	10 21 18.2	2 36 28.04	0.301	13 29 4.5	1.34
	12	2 36 28.85	0.302	13 29 8.1	1.33	11 21 14.3	2 36 35.24	0.298	13 29 36.3	1.32
	13	2 36 36.06	0.299	13 29 39.9	1.32	12 21 10.5	2 36 42.37	0.295	13 30 7.7	1.30
	14	2 36 43.20	0.296	13 30 11.3	1.30	13 21 6.7	2 36 49.42	0.292	13 30 38.7	1.28
	15	2 36 50.26	0.293	13 30 42.3	1.28	14 21 2.9	2 36 56.39	0.289	13 31 0.2	1.26
	16	2 36 57.24	0.289	13 31 12.9	1.26	15 20 59.1	2 37 3.28	0.286	13 31 39.3	1.24
	17	2 37 4.14	0.286	13 31 43.0	1.25	16 20 55.3	2 37 10.10	0.282	13 32 8.9	1.23
	18	2 37 10.97	0.283	13 32 12.7	1.23	17 20 51.4	2 37 16.83	0.279	13 32 38.2	1.21
	19	2 37 17.71	0.279	13 32 42.0	1.21	18 20 47.6	2 37 23.48	0.275	13 33 7.1	1.19
	20	2 37 24.36	0.275	13 33 10.9	1.19	19 20 43.8	2 37 30.04	0.272	13 33 35.5	1.17
	21	2 37 30.93	0.272	13 33 39.3	1.17	20 20 40.0	2 37 36.52	0.268	13 34 3.4	1.15
	22	2 37 37.41	0.268	13 34 7.2	1.15	21 20 36.2	2 37 42.91	0.265	13 34 30.8	1.13
	23	2 37 43.81	0.265	13 34 34.6	1.13	22 20 32.3	2 37 49.22	0.261	13 34 57.7	1.11
	24	2 37 50.12	0.261	13 35 1.5	1.11	23 20 28.5	2 37 55.43	0.257	13 35 24.1	1.09
	25	2 37 56.34	0.257	13 35 27.9	1.09	24 20 24.7	2 38 1.55	0.253	13 35 50.1	1.07
	26	2 38 2.46	0.253	13 35 53.9	1.07	25 20 20.8	2 38 7.58	0.249	13 36 15.6	1.05
	27	2 38 8.49	0.249	13 36 19.4	1.05	26 20 17.0	2 38 13.52	0.245	13 36 40.6	1.03
	28	2 38 14.43	0.245	13 36 44.4	1.03	27 20 13.2	2 38 19.36	0.241	13 37 5.1	1.01
	29	2 38 20.27	0.241	13 37 8.9	1.01	28 20 9.3	2 38 25.10	0.237	13 37 29.1	0.99
	30	2 38 26.01	0.237	13 37 32.9	0.99	29 20 5.5	2 38 30.74	0.233	13 37 52.6	0.97
	31	2 38 31.65	0.233	13 37 56.4	0.97	30 20 1.7	2 38 36.28	0.229	13 38 15.6	0.95
	32	2 38 37.19	+0.229	+13 38 19.3	+0.94	31 19 57.8	2 38 41.72	+0.225	+13 38 38.0	+0.92

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
July	1	h m s 2 38 37.19	+0.229	+13 38 19.3	+0.94	d h m 1 19 57.8	h m s 2 38 41.72	+0.225	+13 38 38.0	+0.92
	2	2 38 42.63	0.225	13 38 41.7	0.92	2 19 54.0	2 38 47.06	0.220	13 38 59.9	0.90
	3	2 38 47.97	0.220	13 39 3.6	0.90	3 19 50.1	2 38 52.30	0.216	13 39 21.3	0.88
	4	2 38 53.20	0.216	13 39 24.9	0.88	4 19 46.3	2 38 57.43	0.212	13 39 42.1	0.86
	5	2 38 58.33	0.212	13 39 45.7	0.86	5 19 42.4	2 39 2.46	0.207	13 40 2.4	0.84
	6	2 39 3.36	0.207	13 40 6.0	0.83	6 19 38.6	2 39 7.39	0.203	13 40 22.2	0.81
	7	2 39 8.28	0.203	13 40 25.7	0.81	7 19 34.7	2 39 12.21	0.198	13 40 41.5	0.79
	8	2 39 13.09	0.198	13 40 44.9	0.79	8 19 30.9	2 39 16.91	0.194	13 41 0.2	0.77
	9	2 39 17.78	0.193	13 41 3.6	0.77	9 19 27.0	2 39 21.50	0.189	13 41 18.4	0.75
	10	2 39 22.36	0.189	13 41 21.7	0.74	10 19 23.2	2 39 25.98	0.185	13 41 36.0	0.72
	11	2 39 26.83	0.184	13 41 39.3	0.72	11 19 19.4	2 39 30.36	0.180	13 41 53.0	0.70
	12	2 39 31.20	0.180	13 41 56.3	0.70	12 19 15.5	2 39 34.62	0.175	13 42 9.5	0.68
	13	2 39 35.46	0.175	13 42 12.7	0.67	13 19 11.6	2 39 38.76	0.170	13 42 25.4	0.65
	14	2 39 39.59	0.170	13 42 28.5	0.65	14 19 7.7	2 39 42.79	0.166	13 42 40.7	0.63
	15	2 39 43.60	0.165	13 42 43.8	0.63	15 19 3.9	2 39 46.71	0.161	13 42 55.5	0.60
	16	2 39 47.50	0.160	13 42 58.5	0.60	16 19 0.0	2 39 50.52	0.156	13 43 9.7	0.58
	17	2 39 51.30	0.156	13 43 12.6	0.58	17 18 56.1	2 39 54.21	0.151	13 43 23.4	0.56
	18	2 39 54.98	0.151	13 43 26.2	0.55	18 18 52.3	2 39 57.78	0.146	13 43 36.5	0.53
	19	2 39 58.53	0.145	13 43 39.2	0.53	19 18 48.4	2 40 1.22	0.141	13 43 49.0	0.51
	20	2 40 1.95	0.140	13 43 51.6	0.50	20 18 44.5	2 40 4.54	0.136	13 44 0.9	0.48
	21	2 40 5.25	0.135	13 44 3.4	0.48	21 18 40.7	2 40 7.75	0.131	13 44 12.2	0.46
	22	2 40 8.44	0.130	13 44 14.6	0.46	22 18 36.8	2 40 10.83	0.126	13 44 23.0	0.44
	23	2 40 11.51	0.125	13 44 25.3	0.43	23 18 32.9	2 40 13.79	0.121	13 44 33.1	0.41
	24	2 40 14.45	0.120	13 44 35.3	0.40	24 18 29.0	2 40 16.63	0.116	13 44 42.6	0.39
	25	2 40 17.27	0.115	13 44 44.7	0.38	25 18 25.1	2 40 19.36	0.111	13 44 51.5	0.36
	26	2 40 19.97	0.110	13 44 53.5	0.35	26 18 21.2	2 40 21.96	0.106	13 44 59.9	0.34
	27	2 40 22.55	0.105	13 45 1.8	0.33	27 18 17.3	2 40 24.43	0.100	13 45 7.7	0.31
	28	2 40 25.00	0.099	13 45 9.5	0.31	28 18 13.4	2 40 26.77	0.095	13 45 15.0	0.29
	29	2 40 27.32	0.094	13 45 16.6	0.28	29 18 9.5	2 40 28.99	0.090	13 45 21.6	0.26
	30	2 40 29.51	0.089	13 45 23.1	0.26	30 18 5.7	2 40 31.08	0.085	13 45 27.6	0.24
	31	2 40 31.58	0.084	13 45 29.0	0.23	31 18 1.8	2 40 33.05	0.079	13 45 33.0	0.21
Aug.	1	2 40 33.52	0.078	13 45 34.2	0.20	1 17 57.9	2 40 34.89	0.074	13 45 37.7	0.19
	2	2 40 35.33	0.073	13 45 38.8	0.18	2 17 54.0	2 40 36.60	0.069	13 45 41.9	0.16
	3	2 40 37.02	0.068	13 45 42.9	0.16	3 17 50.1	2 40 38.19	0.064	13 45 45.6	0.14
	4	2 40 38.58	0.062	13 45 46.4	0.13	4 17 46.2	2 40 39.65	0.058	13 45 48.6	0.11
	5	2 40 40.01	0.057	13 45 49.3	0.11	5 17 42.3	2 40 40.98	0.053	13 45 51.0	0.09
	6	2 40 41.31	0.051	13 45 51.5	0.08	6 17 38.3	2 40 42.18	0.048	13 45 52.7	0.06
	7	2 40 42.48	0.046	13 45 53.1	0.06	7 17 34.4	2 40 43.26	0.043	13 45 53.9	0.04
	8	2 40 43.53	0.041	13 45 54.1	0.03	8 17 30.5	2 40 44.21	0.037	13 45 54.5	+0.01
	9	2 40 44.44	0.035	13 45 54.6	+0.01	9 17 26.6	2 40 45.03	0.031	13 45 54.6	-0.01
	10	2 40 45.22	0.030	13 45 54.5	-0.02	10 17 22.7	2 40 45.71	0.026	13 45 54.0	0.04
	11	2 40 45.87	0.024	13 45 53.7	0.05	11 17 18.7	2 40 46.26	0.021	13 45 52.7	0.06
	12	2 40 46.39	0.019	13 45 52.3	0.07	12 17 14.8	2 40 46.69	0.015	13 45 50.9	0.09
	13	2 40 46.79	0.014	13 45 50.3	0.09	13 17 10.9	2 40 46.99	0.010	13 45 48.6	0.11
	14	2 40 47.06	0.008	13 45 47.8	0.12	14 17 7.0	2 40 47.16	+0.005	13 45 45.6	0.14
	15	2 40 47.19	+0.003	13 45 44.6	0.15	15 17 3.1	2 40 47.21	0.000	13 45 42.0	0.16
	16	2 40 47.20	-0.002	13 45 40.8	0.17	16 16 59.1	2 40 47.13	-0.006	13 45 37.8	0.19
	17	2 40 47.08	0.008	13 45 36.5	0.19	17 16 55.2	2 40 46.92	0.012	13 45 33.0	0.21
	18	2 40 46.83	0.013	13 45 31.5	0.22	18 16 51.3	2 40 46.57	0.017	13 45 27.6	0.24
	19	2 40 46.44	0.019	13 45 25.9	0.25	19 16 47.3	2 40 46.10	0.023	13 45 21.6	0.26
	20	2 40 45.93	0.024	13 45 19.7	0.27	20 16 43.4	2 40 45.50	0.028	13 45 15.1	0.28
	21	2 40 45.29	0.029	13 45 13.0	0.29	21 16 39.4	2 40 44.77	0.033	13 45 8.0	0.31
	22	2 40 44.52	0.035	13 45 5.7	0.32	22 16 35.5	2 40 43.91	0.038	13 45 0.3	0.33
	23	2 40 43.62	0.040	13 44 57.8	0.34	23 16 31.5	2 40 42.93	0.043	13 44 52.0	0.36
	24	2 40 42.60	0.045	13 44 49.3	0.37	24 16 27.6	2 40 41.83	0.049	13 44 43.2	0.39
	25	2 40 41.45	0.050	13 44 40.3	0.39	25 16 23.6	2 40 40.60	0.054	13 44 33.8	0.40
	26	2 40 40.18	0.056	13 44 30.7	0.41	26 16 19.7	2 40 39.24	0.059	13 44 23.8	0.43
	27	2 40 38.78	0.061	13 44 20.5	0.44	27 16 15.7	2 40 37.76	0.064	13 44 13.2	0.45
	28	2 40 37.25	0.066	13 44 9.7	0.46	28 16 11.7	2 40 36.15	0.069	13 44 2.1	0.48
	29	2 40 35.60	0.071	13 43 58.3	0.49	29 16 7.8	2 40 34.42	0.075	13 43 50.4	0.50
	30	2 40 33.82	0.077	13 43 46.4	0.51	30 16 3.8	2 40 32.56	0.080	13 43 38.2	0.52
	31	2 40 31.92	-0.082	+13 43 34.0	-0.53	31 15 59.9	2 40 30.58	-0.085	+13 43 25.4	-0.54

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Sept. 1	h m s	s	° ′ ″	″	d h m	h m s	s	° ′ ″	″	
	2 40 29.89	-0.087	+13 43 21.0	-0.55	1 15 55.9	2 40 28.48	-0.090	+13 43 12.1	-0.56	
	2 40 27.74	0.092	13 43 7.5	0.57	2 15 51.9	2 40 26.25	0.095	13 42 58.3	0.59	
	3 2 40 25.47	0.097	13 42 53.5	0.60	3 15 48.0	2 40 23.90	0.100	13 42 44.0	0.61	
	4 2 40 23.07	0.102	13 42 38.9	0.62	4 15 44.0	2 40 21.44	0.105	13 42 29.1	0.63	
	5 2 40 20.56	0.107	13 42 23.8	0.64	5 15 40.0	2 40 18.86	0.110	13 42 13.7	0.65	
	6 2 40 17.94	0.112	13 42 8.2	0.66	6 15 36.0	2 40 16.17	0.115	13 41 57.7	0.68	
	7 2 40 15.20	0.117	13 41 52.0	0.69	7 15 32.1	2 40 13.36	0.120	13 41 41.3	0.70	
	8 2 40 12.34	0.122	13 41 35.3	0.71	8 15 28.1	2 40 10.43	0.124	13 41 24.4	0.72	
	9 2 40 9.36	0.126	13 41 18.2	0.73	9 15 24.1	2 40 7.39	0.129	13 41 7.0	0.74	
	10 2 40 6.27	0.131	13 41 0.6	0.75	10 15 20.1	2 40 4.23	0.134	13 40 49.1	0.76	
	11 2 40 3.06	0.136	13 40 42.4	0.78	11 15 16.1	2 40 0.96	0.139	13 40 30.7	0.78	
	12 2 39 59.74	0.141	13 40 23.8	0.79	12 15 12.2	2 39 57.58	0.143	13 40 11.8	0.80	
	13 2 39 56.31	0.145	13 40 4.7	0.81	13 15 8.2	2 39 54.09	0.147	13 39 52.5	0.81	
	14 2 39 52.77	0.150	13 39 45.2	0.82	14 15 4.2	2 39 50.50	0.152	13 39 32.8	0.83	
	15 2 39 49.13	0.154	13 39 25.3	0.84	15 15 0.2	2 39 46.80	0.157	13 39 12.7	0.85	
	16 2 39 45.38	0.158	13 39 5.0	0.86	16 14 56.2	2 39 42.99	0.161	13 38 52.1	0.87	
	17 2 39 41.53	0.162	13 38 44.2	0.88	17 14 52.2	2 39 39.07	0.165	13 38 30.9	0.89	
	18 2 39 37.56	0.168	13 38 22.8	0.90	18 14 48.2	2 39 35.05	0.170	13 38 9.3	0.91	
	19 2 39 33.49	0.172	13 38 0.9	0.92	19 14 44.2	2 39 30.93	0.174	13 37 47.2	0.93	
	20 2 39 29.32	0.176	13 37 38.6	0.94	20 14 40.2	2 39 26.71	0.178	13 37 24.7	0.95	
	21 2 39 25.05	0.180	13 37 15.9	0.96	21 14 36.2	2 39 22.39	0.182	13 37 1.7	0.96	
	22 2 39 20.69	0.184	13 36 52.7	0.97	22 14 32.2	2 39 17.98	0.186	13 36 38.4	0.98	
	23 2 39 16.23	0.188	13 36 29.2	0.99	23 14 28.2	2 39 13.48	0.190	13 36 14.8	0.99	
	24 2 39 11.67	0.192	13 36 5.4	1.00	24 14 24.2	2 39 8.88	0.194	13 35 50.8	1.01	
	25 2 39 7.02	0.195	13 35 41.1	1.02	25 14 20.2	2 39 4.19	0.197	13 35 26.3	1.03	
	26 2 39 2.28	0.199	13 35 16.3	1.04	26 14 16.2	2 38 59.41	0.201	13 35 1.3	1.05	
	27 2 38 57.46	0.203	13 34 51.1	1.06	27 14 12.2	2 38 54.55	0.204	13 34 36.0	1.06	
	28 2 38 52.55	0.206	13 34 25.5	1.07	28 14 8.2	2 38 49.60	0.208	13 34 10.3	1.08	
	29 2 38 47.55	0.210	13 33 59.6	1.08	29 14 4.1	2 38 44.57	0.211	13 33 44.3	1.09	
30 2 38 42.47	0.213	13 33 33.5	1.10	30 14 0.1	2 38 39.45	0.215	13 33 18.0	1.10		
Oct. 1	2 38 37.31	0.217	13 33 7.1	1.11	1 13 56.1	2 38 34.25	0.218	13 32 51.4	1.11	
	2 38 32.06	0.220	13 32 40.3	1.13	2 13 52.1	2 38 28.97	0.221	13 32 24.5	1.13	
	3 2 38 26.73	0.223	13 32 13.1	1.14	3 13 48.1	2 38 23.62	0.224	13 31 57.2	1.14	
	4 2 38 21.34	0.226	13 31 45.6	1.15	4 13 44.0	2 38 18.20	0.228	13 31 29.6	1.15	
	5 2 38 15.87	0.230	13 31 17.8	1.16	5 13 40.0	2 38 12.70	0.231	13 31 1.8	1.16	
	6 2 38 10.32	0.233	13 30 49.8	1.17	6 13 36.0	2 38 7.13	0.234	13 30 33.7	1.18	
	7 2 38 4.71	0.235	13 30 21.5	1.18	7 13 32.0	2 38 1.49	0.236	13 30 5.3	1.19	
	8 2 37 59.03	0.238	13 29 52.9	1.19	8 13 28.0	2 37 55.79	0.239	13 29 36.7	1.20	
	9 2 37 53.28	0.241	13 29 24.1	1.20	9 13 23.9	2 37 50.02	0.242	13 29 7.8	1.21	
	10 2 37 47.47	0.244	13 28 55.0	1.22	10 13 19.9	2 37 44.19	0.244	13 28 38.7	1.22	
	11 2 37 41.59	0.246	13 28 25.7	1.23	11 13 15.8	2 37 38.30	0.246	13 28 9.3	1.23	
	12 2 37 35.66	0.248	13 27 56.2	1.24	12 13 11.8	2 37 32.36	0.249	13 27 39.7	1.24	
	13 2 37 29.67	0.251	13 27 26.4	1.25	13 13 7.8	2 37 26.36	0.251	13 27 9.9	1.25	
	14 2 37 23.63	0.253	13 26 56.4	1.25	14 13 3.8	2 37 20.31	0.253	13 26 39.9	1.25	
	15 2 37 17.53	0.255	13 26 26.3	1.26	15 12 59.7	2 37 14.20	0.255	13 26 9.8	1.26	
	16 2 37 11.39	0.257	13 25 56.0	1.27	16 12 55.7	2 37 8.05	0.257	13 25 39.5	1.27	
	17 2 37 5.20	0.259	13 25 25.5	1.28	17 12 51.7	2 37 1.85	0.259	13 25 9.0	1.27	
	18 2 36 58.97	0.260	13 24 54.8	1.28	18 12 47.6	2 36 55.61	0.261	13 24 38.4	1.28	
	19 2 36 52.69	0.262	13 24 24.1	1.28	19 12 43.6	2 36 49.33	0.263	13 24 7.7	1.28	
	20 2 36 46.37	0.264	13 23 53.3	1.29	20 12 39.5	2 36 43.01	0.264	13 23 36.8	1.29	
	21 2 36 40.02	0.265	13 23 22.3	1.30	21 12 35.5	2 36 36.65	0.266	13 23 5.8	1.30	
	22 2 36 33.63	0.267	13 22 51.1	1.30	22 12 31.5	2 36 30.26	0.267	13 22 34.7	1.30	
	23 2 36 27.21	0.268	13 22 19.9	1.30	23 12 27.4	2 36 23.85	0.268	13 22 3.6	1.30	
	24 2 36 20.76	0.269	13 21 48.6	1.30	24 12 23.4	2 36 17.41	0.269	13 21 32.4	1.30	
	25 2 36 14.29	0.270	13 21 17.3	1.31	25 12 19.4	2 36 10.94	0.270	13 21 1.1	1.31	
	26 2 36 7.80	0.271	13 20 45.9	1.31	26 12 15.3	2 36 4.45	0.271	13 20 29.7	1.31	
	27 2 36 1.28	0.272	13 20 14.4	1.31	27 12 11.3	2 35 57.94	0.271	13 19 58.3	1.31	
	28 2 35 54.74	0.273	13 19 42.9	1.31	28 12 7.2	2 35 51.42	0.272	13 19 26.9	1.31	
	29 2 35 48.19	0.273	13 19 11.4	1.31	29 12 3.2	2 35 44.88	0.273	13 18 55.4	1.31	
	30 2 35 41.63	0.274	13 18 39.9	1.31	30 11 59.1	2 35 38.33	0.273	13 18 24.0	1.31	
	31 2 35 35.05	0.274	13 18 8.4	1.31	31 11 55.1	2 35 31.77	0.274	13 17 52.6	1.31	
	32 2 35 28.47	-0.274	+13 17 36.9	-1.31	32 11 51.1	2 35 25.20	-0.274	+13 17 21.3	-1.30	

Date.		FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1879.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Nov. 1		<sup>h</sup> 2 <sup>m</sup> 35 <sup>s</sup> 28.47	-0.274	+13° 17' 36.9"	- 1.31	<sup>d</sup> 1 11 51.1	<sup>h</sup> 2 <sup>m</sup> 35 <sup>s</sup> 25.20	-0.274	+13° 17' 21.3"	- 1.30
2		2 35 21.88	0.275	13 17 5.5	1.31	2 11 47.0	2 35 18.63	0.274	13 16 50.0	1.30
3		2 35 15.29	0.275	13 16 34.1	1.31	3 11 43.0	2 35 12.06	0.274	13 16 18.7	1.30
4		2 35 8.69	0.275	13 16 2.8	1.30	4 11 38.9	2 35 5.48	0.274	13 15 47.5	1.30
5		2 35 2.10	0.275	13 15 31.5	1.30	5 11 34.9	2 34 58.90	0.274	13 15 16.4	1.30
6		2 34 55.51	0.275	13 15 0.3	1.30	6 11 30.8	2 34 52.32	0.274	13 14 45.3	1.29
7		2 34 48.92	0.274	13 14 29.2	1.29	7 11 26.8	2 34 45.76	0.273	13 14 14.3	1.29
8		2 34 42.35	0.274	13 13 58.2	1.29	8 11 22.8	2 34 39.22	0.272	13 13 43.4	1.29
9		2 34 35.79	0.273	13 13 27.3	1.28	9 11 18.7	2 34 32.69	0.272	13 13 12.7	1.28
10		2 34 29.25	0.272	13 12 56.6	1.28	10 11 14.7	2 34 26.17	0.271	13 12 42.1	1.27
11		2 34 22.72	0.272	13 12 26.0	1.27	11 11 10.7	2 34 19.67	0.270	13 12 11.7	1.26
12		2 34 16.21	0.271	13 11 55.5	1.27	12 11 6.6	2 34 13.19	0.269	13 11 41.4	1.26
13		2 34 9.73	0.270	13 11 25.2	1.26	13 11 2.6	2 34 6.74	0.268	13 11 11.3	1.25
14		2 34 3.27	0.269	13 10 55.2	1.25	14 10 58.5	2 34 0.31	0.267	13 10 41.4	1.24
15		2 33 56.84	0.267	13 10 25.3	1.24	15 10 54.5	2 33 53.92	0.266	13 10 11.7	1.23
16		2 33 50.45	0.266	13 9 55.6	1.23	16 10 50.5	2 33 47.56	0.264	13 9 42.2	1.22
17		2 33 44.09	0.264	13 9 26.1	1.22	17 10 46.4	2 33 41.24	0.263	13 9 12.9	1.22
18		2 33 37.77	0.263	13 8 56.9	1.21	18 10 42.4	2 33 34.95	0.261	13 8 43.8	1.21
19		2 33 31.48	0.261	13 8 27.9	1.20	19 10 38.3	2 33 28.70	0.260	13 8 15.0	1.19
20		2 33 25.24	0.259	13 7 59.2	1.19	20 10 34.3	2 33 22.49	0.258	13 7 46.6	1.18
21		2 33 19.04	0.257	13 7 30.8	1.18	21 10 30.2	2 33 16.33	0.256	13 7 18.4	1.17
22		2 33 12.89	0.255	13 7 2.7	1.16	22 10 26.2	2 33 10.22	0.254	13 6 50.5	1.16
23		2 33 6.79	0.253	13 6 34.9	1.15	23 10 22.2	2 33 4.15	0.252	13 6 22.8	1.15
24		2 33 0.74	0.251	13 6 7.3	1.14	24 10 18.2	2 32 58.14	0.249	13 5 55.4	1.13
25		2 32 54.75	0.249	13 5 40.0	1.13	25 10 14.1	2 32 52.19	0.247	13 5 28.4	1.12
26		2 32 48.81	0.246	13 5 13.1	1.11	26 10 10.1	2 32 46.29	0.245	13 5 1.7	1.10
27		2 32 42.93	0.244	13 4 46.6	1.10	27 10 6.1	2 32 40.45	0.242	13 4 35.4	1.09
28		2 32 37.11	0.241	13 4 20.4	1.08	28 10 2.0	2 32 34.68	0.239	13 4 9.5	1.07
29		2 32 31.36	0.238	13 3 54.6	1.07	29 9 58.0	2 32 28.97	0.236	13 3 43.9	1.06
30		2 32 25.68	0.235	13 3 29.1	1.05	30 9 54.0	2 32 23.33	0.234	13 3 18.7	1.04
Dec. 1		2 32 20.06	0.232	13 3 4.0	1.04	1 9 50.0	2 32 17.76	0.231	13 2 53.8	1.03
2		2 32 14.51	0.229	13 2 39.3	1.02	2 9 46.0	2 32 12.26	0.228	13 2 29.3	1.01
3		2 32 9.04	0.226	13 2 15.0	1.00	3 9 41.9	2 32 6.83	0.225	13 2 5.3	0.99
4		2 32 3.64	0.223	13 1 51.2	0.98	4 9 37.9	2 32 1.48	0.221	13 1 41.7	0.97
5		2 31 58.32	0.220	13 1 27.8	0.97	5 9 33.9	2 31 56.21	0.218	13 1 18.5	0.96
6		2 31 53.08	0.217	13 1 4.8	0.95	6 9 29.9	2 31 51.02	0.215	13 0 55.8	0.94
7		2 31 47.92	0.213	13 0 42.3	0.93	7 9 25.8	2 31 45.91	0.211	13 0 33.5	0.92
8		2 31 42.84	0.210	13 0 20.2	0.91	8 9 21.8	2 31 40.88	0.208	13 0 11.7	0.90
9		2 31 37.85	0.206	12 59 58.6	0.89	9 9 17.8	2 31 35.93	0.204	12 59 50.3	0.88
10		2 31 32.95	0.202	12 59 37.5	0.87	10 9 13.8	2 31 31.08	0.200	12 59 29.4	0.86
11		2 31 28.14	0.199	12 59 16.8	0.85	11 9 9.8	2 31 26.32	0.197	12 59 8.9	0.84
12		2 31 23.41	0.195	12 58 56.6	0.83	12 9 5.8	2 31 21.64	0.193	12 58 49.0	0.82
13		2 31 18.78	0.191	12 58 37.0	0.81	13 9 1.8	2 31 17.06	0.189	12 58 29.7	0.80
14		2 31 14.25	0.187	12 58 17.9	0.79	14 8 57.8	2 31 12.58	0.185	12 58 10.8	0.78
15		2 31 9.82	0.183	12 57 59.2	0.77	15 8 53.8	2 31 8.19	0.181	12 57 52.4	0.75
16		2 31 5.48	0.179	12 57 41.1	0.74	16 8 49.8	2 31 3.91	0.176	12 57 34.5	0.73
17		2 31 1.25	0.174	12 57 23.5	0.72	17 8 45.8	2 30 59.73	0.172	12 57 17.2	0.71
18		2 30 57.12	0.170	12 57 6.5	0.70	18 8 41.8	2 30 55.65	0.168	12 57 0.4	0.69
19		2 30 53.10	0.165	12 56 50.0	0.68	19 8 37.8	2 30 51.68	0.163	12 56 44.2	0.67
20		2 30 49.19	0.161	12 56 34.1	0.65	20 8 33.8	2 30 47.81	0.159	12 56 28.5	0.64
21		2 30 45.38	0.156	12 56 18.8	0.63	21 8 29.8	2 30 44.05	0.154	12 56 13.4	0.62
22		2 30 41.68	0.152	12 56 4.0	0.61	22 8 25.8	2 30 40.41	0.149	12 55 58.9	0.59
23		2 30 38.10	0.147	12 55 49.8	0.58	23 8 21.8	2 30 36.88	0.145	12 55 45.0	0.57
24		2 30 34.63	0.142	12 55 36.2	0.56	24 8 17.8	2 30 33.46	0.140	12 55 31.6	0.55
25		2 30 31.28	0.137	12 55 23.2	0.53	25 8 13.8	2 30 30.15	0.135	12 55 18.8	0.52
26		2 30 28.04	0.132	12 55 10.8	0.51	26 8 9.8	2 30 26.96	0.130	12 55 6.6	0.49
27		2 30 24.92	0.127	12 54 59.0	0.48	27 8 5.8	2 30 23.89	0.125	12 54 55.1	0.47
28		2 30 21.92	0.123	12 54 47.8	0.45	28 8 1.8	2 30 20.94	0.120	12 54 44.2	0.44
29		2 30 19.04	0.118	12 54 37.3	0.43	29 7 57.9	2 30 18.11	0.115	12 54 34.0	0.41
30		2 30 16.28	0.113	12 54 27.4	0.40	30 7 53.9	2 30 15.40	0.111	12 54 24.3	0.39
31		2 30 13.64	0.107	12 54 18.1	0.38	31 7 49.9	2 30 12.80	0.106	12 54 15.2	0.37
32		2 30 11.12	-0.102	+12 54 9.5	- 0.35	32 7 45.9	2 30 10.33	-0.100	+12 54 6.8	- 0.34

HORIZONTAL PARALLAXES AND SEMIDIAMETERS.									
Mean Noon.	HORIZONTAL PARALLAXES.			SEMIDIAMETERS.			SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN.		
	♂	♀	♂	♂	♀	♂	♂	♀	♂
Jan. 1	12.22	5.22	3.92	4.61	5.04	2.24	0.33	0.37	0.16
6	10.88	5.24	3.98	4.11	5.06	2.27	0.29	0.37	0.16
11	9.64	5.26	4.04	3.66	5.08	2.31	0.26	0.36	0.17
16	8.76	5.28	4.10	3.31	5.10	2.34	0.24	0.36	0.17
21	8.07	5.31	4.17	3.05	5.13	2.38	0.22	0.36	0.17
26	7.55	5.34	4.24	2.85	5.16	2.42	0.21	0.36	0.18
31	7.17	5.37	4.31	2.71	5.19	2.46	0.20	0.36	0.18
Feb. 5	6.84	5.41	4.38	2.60	5.23	2.50	0.19	0.36	0.18
10	6.67	5.46	4.46	2.52	5.27	2.55	0.18	0.36	0.19
15	6.52	5.50	4.54	2.46	5.31	2.59	0.17	0.36	0.19
20	6.43	5.55	4.63	2.43	5.36	2.64	0.17	0.36	0.19
25	6.40	5.61	4.72	2.42	5.42	2.69	0.17	0.37	0.20
Mar. 2	6.45	5.67	4.81	2.43	5.49	2.75	0.16	0.37	0.20
7	6.60	5.74	4.90	2.49	5.55	2.80	0.16	0.38	0.20
12	6.90	5.81	5.00	2.60	5.62	2.86	0.17	0.38	0.21
17	7.41	5.89	5.10	2.80	5.70	2.92	0.18	0.39	0.21
22	8.23	5.98	5.21	3.11	5.78	2.98	0.20	0.39	0.21
27	9.38	6.07	5.32	3.54	5.87	3.04	0.23	0.40	0.22
April 1	10.87	6.17	5.44	4.10	5.96	3.10	0.27	0.41	0.22
6	12.57	6.28	5.56	4.74	6.07	3.17	0.32	0.42	0.22
11	14.17	6.40	5.68	5.35	6.19	3.24	0.36	0.44	0.23
16	15.27	6.53	5.80	5.76	6.31	3.31	0.39	0.45	0.23
21	15.50	6.67	5.93	5.85	6.44	3.39	0.40	0.46	0.23
26	14.96	6.83	6.06	5.65	6.59	3.47	0.38	0.47	0.24
May 1	13.92	7.00	6.20	5.25	6.76	3.55	0.35	0.49	0.24
6	12.72	7.18	6.35	4.80	6.94	3.63	0.32	0.51	0.24
11	11.52	7.38	6.50	4.35	7.13	3.71	0.29	0.53	0.25
16	10.44	7.60	6.66	3.94	7.34	3.80	0.26	0.54	0.25
21	9.52	7.84	6.82	3.58	7.57	3.89	0.24	0.56	0.26
26	8.65	8.10	6.99	3.27	7.83	3.98	0.22	0.57	0.26
31	7.96	8.38	7.16	3.00	8.11	4.08	0.21	0.59	0.27
June 5	7.39	8.69	7.34	2.79	8.40	4.18	0.20	0.61	0.28
10	6.98	9.02	7.53	2.64	8.72	4.29	0.19	0.63	0.29
15	6.74	9.39	7.72	2.54	9.08	4.40	0.19	0.65	0.30
20	6.69	9.80	7.92	2.52	9.47	4.52	0.19	0.67	0.30
25	6.80	10.26	8.13	2.57	9.91	4.64	0.19	0.69	0.31
30	7.06	10.77	8.35	2.67	10.39	4.77	0.19	0.72	0.32
July 5	7.43	11.33	8.58	2.80	10.93	4.90	0.20	0.75	0.33
10	7.90	11.94	8.82	2.98	11.53	5.04	0.21	0.78	0.34
15	8.48	12.62	9.07	3.20	12.19	5.18	0.22	0.82	0.35
20	9.12	13.39	9.34	3.44	12.93	5.33	0.24	0.87	0.36
25	9.87	14.26	9.62	3.73	13.77	5.50	0.25	0.92	0.37
30	10.76	15.24	9.92	4.06	14.71	5.67	0.27	0.98	0.38
Aug. 4	11.76	16.34	10.24	4.44	15.77	5.85	0.29	1.05	0.39
9	12.80	17.57	10.57	4.83	16.97	6.04	0.32	1.13	0.41
14	13.77	18.96	10.92	5.20	18.31	6.24	0.35	1.22	0.42
19	14.32	20.51	11.31	5.41	19.80	6.46	0.36	1.33	0.44
24	14.12	22.23	11.72	5.33	21.47	6.69	0.35	1.45	0.46
29	12.99	24.09	12.15	4.91	23.27	6.94	0.33	1.57	0.48
Sept. 3	11.38	26.05	12.61	4.30	25.16	7.20	0.30	1.70	0.50
8	9.76	27.98	13.10	3.69	27.02	7.48	0.26	1.83	0.52
13	8.46	29.64	13.62	3.19	28.63	7.78	0.22	1.94	0.54
18	7.54	30.88	14.16	2.85	29.83	8.09	0.19	2.02	0.56
23	6.94	31.47	14.72	2.62	30.40	8.41	0.17	2.05	0.58
28	6.57	31.31	15.30	2.48	30.24	8.74	0.16	2.03	0.61
Oct. 3	6.35	30.33	15.86	2.40	29.30	9.07	0.16	1.96	0.64
8	6.24	28.80	16.45	2.36	27.81	9.40	0.16	1.96	0.66
13	6.21	27.01	17.01	2.34	26.08	9.71	0.16	1.74	0.68
18	6.24	25.12	17.49	2.36	24.26	9.99	0.16	1.62	0.70
23	6.34	23.29	17.89	2.39	22.44	10.22	0.17	1.50	0.72
28	6.49	21.57	18.18	2.45	20.75	10.39	0.17	1.38	0.73

## HORIZONTAL PARALLAXES AND SEMIDIAMETERS.

Mean Noon.	HORIZONTAL PARALLAXES.			SEMIDIAMETERS.			SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN.		
	♂	♀	♂	♂	♀	♂	♂	♀	♂
Nov. 2	6.72	19.93	18.33	2.54	19.19	10.47	0.18	1.28	0.73
7	7.05	18.45	18.31	2.66	17.81	10.46	0.19	1.19	0.73
12	7.49	17.16	18.12	2.83	16.59	10.36	0.21	1.10	0.72
17	8.11	16.04	17.76	3.06	15.49	10.15	0.23	1.03	0.71
22	8.96	15.03	17.27	3.38	14.51	9.86	0.25	0.97	0.69
27	10.14	14.12	16.66	3.83	13.64	9.51	0.28	0.91	0.66
Dec. 2	11.58	13.32	15.97	4.37	12.86	9.12	0.32	0.86	0.64
7	12.79	12.61	15.24	4.83	12.17	8.70	0.35	0.82	0.61
12	12.90	11.97	14.48	4.87	11.56	8.28	0.34	0.78	0.58
17	11.76	11.39	13.73	4.44	11.00	7.85	0.31	0.75	0.55
22	10.34	10.87	13.00	3.90	10.50	7.43	0.28	0.72	0.52
27	19.17	10.40	12.30	3.46	10.04	7.03	0.25	0.69	0.49
32	8.29	9.97	11.64	3.13	9.62	6.66	0.22	0.67	0.46
Mean Noon.	♂	h	♂	♂	h	♂	♂	h	♂
Jan. 1	1.50	0.91	0.50	15.39	8.07	1.89	1.20	0.58	0.13
11	1.49	0.90	0.50	15.81	7.93	1.90	1.18	0.57	0.13
21	1.48	0.88	0.51	15.69	7.82	1.92	1.17	0.56	0.13
31	1.47	0.87	0.51	15.63	7.72	1.93	1.16	0.55	0.13
Feb. 10	1.47	0.86	0.51	15.62	7.63	1.93	1.15	0.54	0.13
20	1.47	0.86	0.51	15.65	7.56	1.93	1.15	0.54	0.13
Mar. 2	1.48	0.85	0.51	15.74	7.51	1.93	1.15	0.54	0.13
12	1.49	0.85	0.51	15.89	7.47	1.93	1.16	0.53	0.13
22	1.51	0.84	0.51	16.10	7.46	1.92	1.17	0.53	0.13
April 1	1.53	0.84	0.50	16.36	7.46	1.91	1.18	0.53	0.13
11	1.56	0.85	0.50	16.67	7.48	1.90	1.20	0.53	0.13
21	1.60	0.85	0.50	17.05	7.52	1.88	1.22	0.54	0.13
May 1	1.64	0.86	0.49	17.48	7.57	1.87	1.25	0.54	0.13
11	1.68	0.86	0.49	17.96	7.64	1.85	1.28	0.55	0.13
21	1.74	0.87	0.48	18.49	7.73	1.83	1.32	0.55	0.13
31	1.80	0.89	0.48	19.07	7.83	1.82	1.36	0.56	0.12
June 10	1.86	0.90	0.48	19.69	7.95	1.80	1.41	0.57	0.12
20	1.92	0.91	0.47	20.34	8.07	1.79	1.45	0.58	0.12
30	1.98	0.93	0.47	21.00	8.21	1.77	1.50	0.59	0.12
July 10	2.04	0.95	0.47	21.66	8.36	1.76	1.55	0.60	0.12
20	2.10	0.96	0.46	22.27	8.51	1.75	1.60	0.61	0.12
30	2.14	0.98	0.46	22.80	8.66	1.75	1.64	0.62	0.12
Aug. 9	2.18	1.00	0.46	23.23	8.80	1.74	1.67	0.63	0.12
19	2.21	1.01	0.46	23.50	8.93	1.73	1.69	0.64	0.12
29	2.22	1.02	0.46	23.62	9.05	1.73	1.70	0.65	0.12
Sept. 8	2.22	1.04	0.46	23.57	9.15	1.74	1.70	0.65	0.12
18	2.20	1.04	0.46	23.33	9.23	1.74	1.69	0.66	0.12
28	2.16	1.05	0.46	22.96	9.27	1.75	1.66	0.66	0.12
Oct. 8	2.11	1.05	0.46	22.46	9.27	1.75	1.63	0.66	0.12
18	2.06	1.05	0.47	21.86	9.25	1.76	1.59	0.66	0.12
28	1.99	1.04	0.47	21.20	9.19	1.78	1.54	0.66	0.12
Nov. 7	1.93	1.03	0.47	20.56	9.10	1.80	1.50	0.65	0.12
17	1.86	1.02	0.48	19.89	8.99	1.81	1.45	0.64	0.12
27	1.80	1.00	0.48	19.25	8.86	1.82	1.40	0.63	0.12
Dec. 7	1.75	0.99	0.49	18.66	8.71	1.84	1.35	0.62	0.13
17	1.71	0.97	0.49	18.11	8.56	1.86	1.31	0.61	0.13
27	1.66	0.95	0.50	17.61	8.41	1.88	1.27	0.60	0.13
37	1.62	0.94	0.50	17.17	8.27	1.89	1.24	0.59	0.13

Horizontal Parallax of Neptune, 0".30, Jan. 1 to Feb. 6; July 25 to Sept. 28; and after Dec. 6.

" " " 0".29, Feb. 7 to July 24.

" " " 0".31, Sept. 9 to Dec. 6.

Date. 1879.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. — p.
Jan. 1.0	+1873367	2685	—8854608	4820	—3842055	1897	290 58 61.6	47.0	+0.32	8.92
1.5	.1959144	8459	.8838948	9166	.3835259	5104	281 29 36.4	21.7	0.33	26570
2.0	.2044764	4076	.8822600	2825	.3828166	8015	281 59 71.1	56.3	0.33	26559
2.5	.2130222	9631	.8805568	5799	.3820777	0629	282 30 45.7	30.8	0.32	26554
3.0	.2215511	4817	.8787854	8091	.3813092	2947	282 30 45.7	30.8	0.32	26555
3.5	.2300626	9929	.8769459	9703	.3805110	4969	283 1 20.2	5.2	0.31	26563
4.0	.2385560	4860	.8750386	0637	.3796833	6696	283 31 54.6	39.5	0.29	26577
4.5	.2470306	9603	.8730635	0892	.3788263	8129	284 2 28.9	13.7	0.26	26597
5.0	.2554858	4153	.8710207	0470	.3779401	9270	284 32 63.2	47.9	0.22	26624
5.5	.2639210	8502	.8689104	9374	.3770247	0120	285 3 37.4	22.1	0.17	26658
6.0	.2723356	2646	.8667329	7606	.3760802	0679	285 33 71.5	56.1	0.12	26699
6.5	.2807290	6577	.8644883	5166	.3751066	0946	286 4 45.5	30.0	0.07	26748
7.0	.2891005	0290	.8621767	2057	.3741040	0923	286 35 19.5	3.9	+0.01	26804
7.5	.2974446	3779	.8597984	8291	.3730724	0611	287 5 53.4	37.7	—0.05	26867
8.0	.3057757	7038	.8573536	3840	.3720119	0010	287 36 27.3	11.5	0.11	26937
8.5	.3140782	0061	.8548425	8736	.3709227	9121	288 6 61.1	45.2	0.18	27013
9.0	.3223564	2841	.8522651	2969	.3698047	7944	288 37 34.9	18.9	0.25	27097
9.5	.3306099	5374	.8496217	6542	.3686581	6482	289 7 68.6	52.5	0.32	27188
10.0	.3388380	7654	.8469125	9459	.3674829	4734	289 38 42.2	26.0	0.39	27287
10.5	.3470400	9673	.8441377	1716	.3662792	2700	290 8 75.7	59.5	0.45	27393
11.0	.3552154	1425	.8412974	3320	.3650471	0393	290 39 49.3	33.0	0.51	27505
11.5	.3633635	2904	.8383919	4272	.3637867	7783	291 10 22.8	6.4	0.57	27624
12.0	.3714838	4106	.8354214	4574	.3624980	4900	291 40 56.2	39.7	0.63	27750
12.5	.3795756	5023	.8323860	4227	.3611812	1735	292 11 29.6	13.0	0.68	27883
13.0	.3876383	5649	.8292860	3234	.3598363	8290	292 41 62.9	46.2	0.72	28021
13.5	.3956713	5978	.8261213	1596	.3584633	4564	293 12 36.2	19.4	0.76	28165
14.0	.4036739	6003	.8228926	9315	.3570623	0558	293 42 69.5	52.6	0.79	28316
14.5	.4116455	5718	.8195995	6391	.3556335	6274	294 13 42.7	25.7	0.82	28473
15.0	.4195855	5117	.8162425	2828	.3541770	1713	294 43 75.9	58.8	0.85	28636
15.5	.4274933	4193	.8128219	8630	.3526929	6876	295 14 49.0	31.9	0.85	28804
16.0	.4353682	2943	.8093380	3798	.3511812	1763	295 45 22.1	4.9	0.85	28978
16.5	.4432096	1356	.8057910	8335	.3496421	6376	296 15 55.1	37.8	0.85	29157
17.0	.4510168	9428	.8021813	2245	.3480757	0716	296 46 28.0	10.6	0.84	29340
17.5	.4587891	7151	.7985090	5530	.3464821	4784	297 16 60.9	43.4	0.83	29529
18.0	.4665260	4520	.7947744	8192	.3448615	8582	297 47 33.7	16.1	0.81	29722
18.5	.4742267	1527	.7909777	0232	.3432140	1911	298 17 66.3	48.6	0.78	29920
19.0	.4818907	8167	.7871192	1654	.3415396	5371	298 48 38.8	21.0	0.74	30121
19.5	.4895174	4434	.7831993	2463	.3398385	8364	299 18 71.2	53.3	0.69	30327
20.0	.4971062	0322	.7792181	2659	.3381108	1091	299 49 43.6	25.6	0.65	30538
20.5	.5046555	5825	.7751760	2245	.3363566	3553	300 19 75.8	57.8	0.58	30753
21.0	.5121677	0938	.7710733	1225	.3345762	5753	300 50 47.9	29.8	0.52	30972
21.5	.5196392	5653	.7669105	9605	.3327696	7691	301 21 19.8	1.6	0.46	31195
22.0	.5270702	9964	.7626879	7387	.3309370	9370	301 51 51.6	33.3	0.40	31422
22.5	.5344600	3863	.7584059	4574	.3290787	0791	302 22 23.2	4.8	0.33	31653
23.0	.5418080	7344	.7540648	1171	.3271947	1955	302 52 54.6	36.1	0.26	31887
23.5	.5491136	0401	.7496650	7181	.3252853	2866	303 23 25.8	7.2	0.19	32125
24.0	.5563763	3029	.7452070	2609	.3233506	3524	303 53 56.7	38.0	0.13	32367
24.5	.5635955	5222	.7406910	7456	.3213908	3930	304 24 27.4	8.7	0.07	32613
25.0	.5707706	6975	.7361173	1726	.3194059	4085	304 54 57.8	39.0	—0.01	32862
25.5	.5779011	8281	.7314865	5426	.3173963	3994	305 25 28.0	9.2	+0.04	33115
26.0	.5849865	9137	.7267988	8557	.3153621	3657	305 55 58.0	39.1	0.09	33372
26.5	.5920262	9535	.7220548	1124	.3133035	3075	306 26 27.7	8.7	0.14	33632
27.0	.5990197	9472	.7172548	3132	.3112206	2250	306 56 57.0	37.9	0.18	33897
27.5	.6059664	8941	.7123994	4586	.3091137	1186	307 27 26.1	6.9	0.22	34166
28.0	.6128658	7937	.7074889	5489	.3069829	9883	307 57 54.9	35.6	0.25	34439
28.5	.6197173	6454	.7025238	5845	.3048285	8343	308 28 23.4	4.0	0.27	34717
29.0	.6265204	4488	.6975045	5660	.3026506	6568	308 58 51.5	32.0	0.28	34999
29.5	.6332747	2033	.6924314	4937	.3004494	4561	309 28 79.3	59.8	0.28	35286
30.0	.6399797	9086	.6873050	3680	.2982251	2323	309 59 46.8	27.2	0.28	35577
30.5	.6466350	5641	.6821257	1894	.2959779	9855	310 29 74.0	54.4	0.27	35873
31.0	.6532400	1694	.6768940	9584	.2937079	7160	311 0 40.8	21.1	0.25	36175
31.5	+6597944	7241	—6716102	6754	—2914154	4240	311 30 67.3	47.5	0.23	36481
							312 11 33.5	13.6	+0.20	36793

NOTE.—The accented letters correspond to the mean equinox and equator of January 0.0.

# SUN'S COÖRDINATES, 1879. 389

Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1879.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. — $\rho$ .
Feb. 1.0	+6662977	2277	—6662748	3408	—2391005	1096	312° 31' 59.3	39.3	+0.17	9.99
1.5	6727495	6798	6608883	9550	2867635	7730	313 2 24.8	4.7	0.12	37433
2.0	6791492	0798	6554510	5184	2844044	4143	313 32 50.0	29.9	0.07	37761
2.5	6854964	4273	6599635	10317	2820236	0340	314 2 74.8	54.6	+0.02	38095
3.0	6917906	7219	6444262	4952	2796212	6321	314 33 39.2	19.0	—0.04	38435
3.5	6980315	9631	6388395	9093	2771974	2088	315 3 63.3	43.0	0.10	38782
4.0	7042186	1506	6332038	2743	2747524	7643	315 34 27.1	6.8	0.17	39134
4.5	7103515	2838	6275195	5907	2722861	2988	316 4 50.6	30.2	0.23	39491
5.0	7164298	3625	6217870	8589	2697995	8123	316 34 73.7	53.2	0.30	39854
5.5	7224530	3861	6160070	0797	2672919	3052	317 5 36.5	15.9	0.37	40224
6.0	7284208	3543	6101798	2532	2647638	7776	317 35 59.0	38.3	0.44	40600
6.5	7343328	2667	6043059	3800	2622154	2296	318 6 21.2	0.4	0.50	40982
7.0	7401885	1229	5983857	4605	2596468	6614	318 36 43.0	22.2	0.56	41360
7.5	7459875	9223	5924196	4951	2570584	0735	319 6 64.5	43.6	0.61	41762
8.0	7517293	6646	5864081	4843	2544502	4658	319 37 25.7	4.8	0.66	42161
8.5	7574135	3492	5803516	4285	2518225	8386	320 7 46.6	25.6	0.71	42566
9.0	7630398	0760	5742504	3280	2491755	1920	320 37 67.1	46.1	0.75	42977
9.5	7686079	5446	5681050	1833	2465092	5262	321 8 27.4	6.3	0.79	43393
10.0	7741173	0543	5619159	9949	2438239	8414	321 38 47.4	26.2	0.82	43814
10.5	7795676	5053	5556335	7632	2411197	1376	322 8 67.2	45.9	0.85	44241
11.0	7849585	8967	5494082	4886	2383968	4151	322 39 26.7	5.3	0.85	44672
11.5	7902895	2282	5430905	1716	2356555	6743	323 9 45.9	24.4	0.85	45108
12.0	7955601	4093	5367309	8127	2328960	9153	323 39 64.8	43.3	0.85	45549
12.5	8007699	7096	5303299	4124	2301185	1383	324 10 23.4	1.8	0.84	45995
13.0	8059186	8589	5238879	9710	2273232	3434	324 40 41.7	20.1	0.82	46445
13.5	8110057	19465	5174055	4893	2245103	5310	325 10 59.7	38.0	0.79	46900
14.0	8160307	19721	5108832	9677	2216801	7013	325 40 77.4	55.7	0.76	47359
14.5	8209932	9352	5043213	4064	2188327	8543	326 11 34.8	13.0	0.73	47821
15.0	8258927	8353	4977293	8060	2159683	9903	326 41 51.9	30.0	0.69	48286
15.5	8307289	6721	4910807	1671	2130871	1096	327 11 68.6	46.7	0.64	48754
16.0	83555015	4453	4844030	4900	2101893	2123	327 42 25.1	3.1	0.58	49225
16.5	8402101	1545	4776878	7754	2072753	2988	328 12 41.3	19.2	0.52	49700
17.0	8448544	7994	4709357	10239	2042452	3691	328 42 57.2	35.1	0.46	50178
17.5	8494340	3796	4641472	2360	2013993	4237	329 12 72.7	50.5	0.39	50654
18.0	8539485	8948	4573229	4123	1984379	4628	329 43 27.8	5.6	0.32	51140
18.5	8583975	3444	4504633	5533	1954612	4865	330 13 42.6	20.3	0.25	51625
19.0	8627805	7281	4435691	6597	1924693	4950	330 43 57.0	34.7	0.19	52112
19.5	8670973	0456	4366407	7319	1894626	4888	331 13 70.9	48.5	0.12	52602
20.0	8713475	2965	4296786	7704	1864413	4680	331 44 24.5	2.0	—0.06	53094
20.5	8755308	4805	4226835	7759	1834057	4329	332 14 37.8	15.2	0.00	53588
21.0	8796469	5973	4156558	7487	1803561	3837	332 44 50.7	28.1	+0.05	54084
21.5	8836955	6466	4085961	6896	1772927	3208	333 14 63.1	40.4	0.11	54581
22.0	8876762	6280	4015050	5991	1742156	2442	333 44 75.1	52.4	0.16	55080
22.5	8915886	5411	3943833	4779	1711252	1542	334 15 26.6	3.8	0.20	55581
23.0	8954325	3858	3872316	3269	1680217	0611	334 45 37.7	14.9	0.24	56083
23.5	8992077	1617	3800504	1461	1649056	9355	335 15 48.3	25.4	0.27	56587
24.0	9029139	8687	3728402	9365	1617769	8073	335 45 58.4	35.5	0.30	57093
24.5	9065509	5064	3656017	6985	1586359	6667	336 15 68.1	45.1	0.31	57602
25.0	9101185	0748	3583354	4327	1554830	5142	336 45 77.3	54.2	0.32	58113
25.5	9136165	5736	3510419	1398	1523184	3501	337 16 26.0	2.8	0.31	58626
26.0	9170446	0025	3437219	8203	1491423	1745	337 46 34.2	11.0	0.30	59141
26.5	9204027	3614	3363761	4750	1459550	9876	338 16 41.9	18.6	0.29	59658
27.0	9236905	6500	3290030	1044	1427567	7897	338 46 49.1	25.8	0.27	60178
27.5	9269079	8642	3216092	7091	1395478	5813	339 16 55.7	32.3	0.24	60701
28.0	9300547	0158	3141892	2896	1363284	3623	339 46 61.8	38.4	0.21	61226
28.5	9331306	0925	3067456	8465	1330988	1331	340 16 67.4	43.9	0.17	61754
Mar. 1.0	9361355	0982	2992791	3804	1298591	8938	340 46 72.6	49.1	0.13	62284
1.5	9390692	0328	2917902	8920	1266098	6450	341 16 77.2	53.6	0.08	62817
2.0	9419316	8961	2842795	3817	1233511	3867	341 46 81.2	57.5	+0.02	63354
2.5	9447225	6879	2767476	8502	1200832	1192	342 17 24.7	0.9	—0.04	63894
3.0	+9474419	4082	—2691950	2980	—1168064	8428	342 47 27.7	3.9	—0.10	64437

NOTE.—+ denotes a change in the preceding figure.



Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1879.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Mar. 3.5	+ .9500896	0567	-.2616224	7259	-.1135209	5577	343 17 30.2	6.3	+0.16	64984
4.0	.9526654	6334	.2540303	1342	.1102271	2643	343 47 32.2	8.3	0.23	65534
4.5	.9551692	1381	.2464193	5236	.1069251	9627	344 17 33.6	9.6	0.29	66087
5.0	.9576010	5708	.2387000	8947	.1036151	6531	344 47 34.5	10.5	0.36	66644
5.5	.9599606	9313	.2311429	2480	.1002974	3358	345 17 35.0	10.9	0.42	67206
6.0	.9622479	2195	.2234786	5841	.0969721	0109	345 47 34.9	10.8	0.49	67771
6.5	.9644627	4352	.2157976	9035	.0936395	6787	346 17 34.3	10.1	0.55	68339
7.0	.9666049	5784	.2081005	2068	.0902998	3394	346 47 33.2	9.0	0.60	68911
7.5	.9686744	6488	.2003877	4944	.0869533	9933	347 17 31.7	7.4	0.65	69487
8.0	.9706712	6465	.1926599	7670	.0836002	6406	347 47 29.7	5.4	0.69	70066
8.5	.9725951	5715	.1849175	10249	.0802409	2817	348 17 27.2	2.8	0.73	70649
9.0	.9744460	4232	.1771611	2688	.0768755	9167	348 46 84.2	59.8	0.76	71236
9.5	.9762237	2018	.1693913	4994	.0735043	5459	349 16 80.8	56.3	0.78	71826
10.0	.9779282	9073	.1616087	7171	.0701274	1696	349 46 76.9	52.4	0.80	72419
10.5	.9795594	5394	.1538136	9223	.0667452	7876	350 16 72.5	47.9	0.80	73016
11.0	.9811172	0982	.1460067	1157	.0633579	4007	350 46 67.8	43.2	0.81	73616
11.5	.9826014	5833	.1381887	2980	.0599657	0089	351 16 62.7	38.0	0.80	74219
12.0	.9840118	1947	.1303600	4696	.0565688	6124	351 46 57.1	32.4	0.79	74824
12.5	.9853484	3323	.1225214	6313	.0531675	2115	352 16 51.0	26.2	0.77	75432
13.0	.9866111	5960	.1146734	7836	.0497620	8063	352 46 44.5	19.7	0.74	76043
13.5	.9877998	7857	.1068166	9271	.0463526	3973	353 16 37.5	12.6	0.70	76655
14.0	.9889145	9014	.0989514	10622	.0429394	9845	353 46 30.1	5.2	0.66	77271
14.5	.9899550	9429	.0910784	1894	.0395229	5683	354 15 82.3	57.3	0.61	77838
15.0	.9909211	9101	.0831982	3094	.0361032	1489	354 45 74.1	49.1	0.56	78505
15.5	.9918128	8028	.0753113	4228	.0326807	7268	355 15 65.5	40.5	0.50	79123
16.0	.9926301	6211	.0674183	5300	.0292556	3021	355 45 56.4	31.3	0.44	79743
16.5	.9933728	3648	.0595198	6317	.0258281	8749	356 15 46.9	21.8	0.38	80365
17.0	.9940408	0339	.0516165	7286	.0223985	4456	356 45 37.0	11.8	0.31	80988
17.5	.9946341	6283	.0437091	8214	.0189671	0146	357 15 26.6	1.4	0.25	81610
18.0	.9951529	1481	.0357982	9107	.0155341	5819	357 44 75.8	50.5	0.18	82233
18.5	.9955969	5931	.0278843	9970	.0120998	1479	358 14 64.5	39.2	0.11	82857
19.0	.9959660	9633	.0199680	10808	.0086645	7129	358 44 52.8	27.4	-0.04	83482
19.5	.9962603	2586	.0120500	1630	.0052285	2773	359 14 40.6	15.2	+0.03	84106
20.0	.9964798	4792	-.0041308	2440	-.0017919	8410	359 44 28.0	2.5	0.09	84729
20.5	.9966243	6248	+ .0037889	6756	+ .0016448	5954	0 13 74.9	49.4	0.15	85352
21.0	.9966940	6956	.0117085	5951	.0050815	0318	0 43 61.3	35.7	0.20	85975
21.5	.9966888	6915	.0196273	5138	.0085177	4677	1 13 47.2	21.6	0.25	86596
22.0	.9966088	6126	.0275447	4311	.0119534	9031	1 43 32.6	6.9	0.29	87217
22.5	.9964541	4590	.0354600	3463	.0153881	3375	2 12 77.5	51.8	0.32	87838
23.0	.9962247	2307	.0433726	2588	.0188216	7708	2 42 61.9	36.1	0.35	88459
23.5	.9959207	9277	.0512819	1680	.0222536	2025	3 12 45.8	20.0	0.37	89079
24.0	.9955420	5501	.0591573	0733	.0256839	6325	3 42 29.1	3.2	0.39	89698
24.5	.9950888	0980	.0670882	19741	.0291122	0605	4 11 71.9	46.0	0.40	90316
25.0	.9945611	5714	.0749840	8698	.0325382	4863	4 41 54.2	28.2	0.40	90932
25.5	.9939590	9704	.0828740	7597	.0359617	9095	5 11 35.9	9.9	0.38	91548
26.0	.9932825	2950	.0907576	6432	.0393824	3299	5 40 77.1	51.0	0.36	92164
26.5	.9925318	5454	.0986342	5197	.0428000	7472	6 10 57.7	31.6	0.34	92778
27.0	.9917071	7219	.1065031	3886	.0462142	1612	6 40 37.7	11.5	0.31	93392
27.5	.9908085	8244	.1143637	2491	.0496248	5715	7 9 77.1	50.9	0.27	94005
28.0	.9898361	8531	.1222154	1008	.0530315	19779	7 39 56.0	29.7	0.23	94618
28.5	.9887902	8083	.1300574	19430	.0564341	3803	8 9 34.3	8.0	0.18	95230
29.0	.9876709	6901	.1378899	7753	.0598323	7783	8 38 71.9	45.5	0.13	95842
29.5	.9864783	4987	.1457115	5969	.0632258	1715	9 8 49.0	22.6	+0.07	96455
30.0	.9852127	2342	.1535218	4072	.0666144	5599	9 37 85.5	59.0	0.00	97068
30.5	.9838742	8968	.1613203	2057	.0699979	9432	10 7 61.4	34.8	-0.07	97680
31.0	.9824628	4866	.1691066	19921	.0733761	3212	10 37 36.7	10.0	0.13	98293
31.5	.9809788	10037	.1768801	7656	.0767488	6937	11 6 71.5	44.8	0.19	98906
Apr. 1.0	.9794224	4485	.1846403	5258	.0801156	0603	11 36 45.7	18.9	0.25	99520
1.5	.9777937	8209	.1923866	2721	.0834764	4200	12 5 79.3	52.5	0.31	00134
2.0	.9760930	1214	.2001185	0041	.0868310	7753	12 35 52.3	25.4	0.37	00748
2.5	+ .9743204	3499	+ .2078354	7210	+ .0901790	1231	13 4 84.8	57.9	-0.43	01364

• The first figures of this and the following logarithms are 0.00.

# SUN'S COÖRDINATES, 1879. 391

Date 1879.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Apr. 3.0	+9724762	5069	+2155367	4224	+0935204	4643	$13^{\circ} 34' 56.8''$	$29.8'$	-0.48	<b>0.00</b> 01980
3.5	.9705606	5924	.2232219	1076	.0968549	7985	14 4 28.2	1.1	0.53	02597
4.0	.9685738	6067	.2308904	7762	.1001820	1256	14 33 59.0	31.9	0.57	03216
4.5	.9665158	5500	.2385419	4278	.1035018	4451	15 3 29.3	2.1	0.61	03836
5.0	.9643869	4223	.2461758	0618	.1068140	7571	15 32 59.0	31.8	0.65	04457
5.5	.9621873	2239	.2537916	6777	.1101184	0613	16 2 28.3	1.0	0.67	05078
6.0	.9599171	9549	.2613887	2749	.1134148	3576	16 31 57.1	29.8	0.69	05699
6.5	.9575766	6155	.2689667	8530	.1167029	6455	17 0 85.4	58.0	0.70	06321
7.0	.9551659	2060	.2765250	4114	.1199826	9250	17 30 53.2	25.8	0.71	06945
7.5	.9526852	7265	.2840630	9495	.1232534	1957	17 59 80.4	52.9	0.70	07570
8.0	.9501347	1772	.2915803	4670	.1265151	4573	18 29 47.1	19.6	0.69	08196
8.5	.9475148	5584	.2990763	9631	.1297677	7097	18 58 73.3	45.7	0.67	08822
9.0	.9448255	8703	.3065505	4375	.1330109	9527	19 28 39.1	11.5	0.64	09449
9.5	.9420670	1130	.3140026	8898	.1362446	1863	19 57 64.4	36.7	0.61	10076
10.0	.9392395	2867	.3214320	3194	.1394684	4100	20 27 29.3	1.5	0.57	10703
10.5	.9363431	3915	.3288382	7258	.1426822	6237	20 56 53.8	26.0	0.52	11330
11.0	.9333780	4276	.3362206	1084	.1458857	8271	21 25 77.8	49.9	0.47	11957
11.5	.9303445	3953	.3435787	4667	.1490787	0200	21 55 41.3	13.4	0.41	12583
12.0	.9272427	2947	.3509120	8002	.1522609	2021	22 24 64.5	36.5	0.35	13209
12.5	.9240729	1261	.3582200	1084	.1554322	3733	22 53 87.3	59.3	0.29	13834
13.0	.9208353	8897	.3655020	3906	.1585922	5332	23 23 49.6	21.5	0.22	14459
13.5	.9175301	5857	.3727575	6463	.1617408	6817	23 52 71.4	43.3	0.15	15082
14.0	.9141576	2144	.3799860	8751	.1648776	8184	24 22 32.8	4.6	0.08	15704
14.5	.9107180	7760	.3871870	0763	.1680026	9433	24 51 53.9	25.6	-0.01	16324
15.0	.9072116	2708	.3943599	2495	.1711153	0559	25 20 74.5	46.1	+0.06	16943
15.5	.9036326	6990	.4015042	3941	.1742156	1562	25 50 34.6	6.2	0.13	17560
16.0	.8999922	0608	.4086193	5095	.1773032	2438	26 19 54.3	25.8	0.19	18175
16.5	.8962937	3565	.4157048	5953	.1803780	3185	26 48 73.6	45.1	0.25	18787
17.0	.8925224	5964	.4227602	6510	.1834396	3800	27 18 32.5	3.9	0.30	19397
17.5	.8886856	7508	.4297849	6760	.1864880	4284	27 47 51.0	22.3	0.35	20005
18.0	.8847836	8499	.4367784	6699	.1895227	4631	28 16 69.0	40.3	0.39	20610
18.5	.8808166	8841	.4437401	6319	.1925436	4840	28 45 86.5	57.8	0.43	21211
19.0	.8767850	8537	.4506694	5615	.1955504	4908	29 15 43.6	14.8	0.47	21810
19.5	.8726891	7590	.4575659	4584	.1985429	4833	29 44 60.3	31.4	0.50	22406
20.0	.8685292	6003	.4644290	3219	.2015209	4613	30 13 76.5	47.5	0.52	22999
20.5	.8643056	3779	.4712582	1514	.2044842	4246	30 43 32.3	3.2	0.52	23588
21.0	.8600187	0922	.4780530	9466	.2074324	3728	31 12 47.6	18.5	0.52	24174
21.5	.8556638	7435	.4848128	7068	.2103654	3058	31 41 62.5	33.4	0.52	24756
22.0	.8512563	3322	.4915371	4315	.2132830	2234	32 10 76.8	47.6	0.51	25335
22.5	.8467817	8588	.4982253	1202	.2161849	1253	32 40 30.6	1.4	0.49	25910
23.0	.8422453	3236	.5048770	7722	.2190710	0114	33 9 44.0	14.7	0.47	26482
23.5	.8376476	7271	.5114916	3872	.2219409	8814	33 38 56.9	27.6	0.44	27050
24.0	.8329889	0696	.5180687	9647	.2247946	7352	34 7 69.2	39.8	0.40	27615
24.5	.8282696	3515	.5246080	5044	.2276317	5723	34 36 81.0	51.5	0.35	28177
25.0	.8234902	5733	.5311090	0058	.2304522	3928	35 6 32.3	2.7	0.30	28736
25.5	.8186511	7354	.5375711	4683	.2332558	1965	35 35 43.1	13.5	0.25	29291
26.0	.8137525	8380	.5439938	8915	.2360423	9831	36 4 53.5	23.8	0.19	29843
26.5	.8087949	8816	.5503767	2748	.2388115	7523	36 33 63.3	33.6	0.13	30392
27.0	.8037788	8667	.5567193	6179	.2415632	5041	37 2 72.6	42.8	0.07	30938
27.5	.7997047	7938	.5630212	9203	.2442973	2383	37 31 81.3	51.5	+0.01	31481
28.0	.7955730	6633	.5692819	1815	.2470135	9546	38 0 89.5	59.6	-0.06	32022
28.5	.7883842	4757	.5755011	4012	.2497117	6529	38 30 37.2	7.2	0.13	32560
29.0	.7831388	2315	.5816785	5791	.2523917	3330	38 59 44.4	14.3	0.19	33096
29.5	.7778371	9309	.5878136	7147	.2550534	9948	39 28 51.1	20.9	0.25	33629
30.0	.7724794	5744	.5939061	8078	.2576965	6380	39 57 57.2	26.9	0.30	34161
30.5	.7670662	1625	.5999555	8577	.2603210	2626	40 26 62.9	32.6	0.35	34691
May 1.0	.7615979	6954	.6059614	8641	.2629267	8686	40 55 68.1	37.7	0.39	35219
1.5	.7560750	1737	.6119234	8267	.2655134	4552	41 24 72.8	42.4	0.43	35744
2.0	.7504979	5978	.6178412	7451	.2680809	0229	41 53 77.0	46.5	0.47	36267
2.5	.7448670	9680	.6237145	6190	.2706292	5713	42 22 80.7	50.2	0.50	36790
3.0	+7391827	2849	+6295428	4479	+2731580	1002	42 51 84.0	53.4	-0.52	37311

NOTE: + denotes a change in the preceding figure.

Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1879.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. $= \rho$ .
May 3.5	+7334456	5490	+6353257	2314	+2756671	6095	43 20 86.8	56.1	-0.53	0.00
4.0	7276560	7605	6410629	29692	2781564	0990	43 49 89.1	58.3	0.54	37830
4.5	7218144	9201	6467541	6610	2806258	5685	44 19 31.1	0.2	0.53	38863
5.0	7159213	10252	6523991	3066	2830751	0150	44 48 32.6	1.6	0.52	39378
5.5	7099770	10851	6579973	9054	2855042	4473	45 17 33.7	2.7	0.50	39891
6.0	7039818	10910	6635482	4570	2879129	8562	45 46 34.3	3.2	0.48	40403
6.5	6979362	10466	6690517	19611	2903010	2444	46 16 34.5	3.4	0.44	40913
7.0	6918407	9523	6745074	4175	2926683	6119	46 44 34.4	3.2	0.41	41421
7.5	6856956	8084	6799149	8257	2950147	19585	47 13 33.9	2.7	0.37	41928
8.0	6795013	6152	6852737	1852	2973401	2841	47 42 32.9	1.6	0.33	42433
8.5	6732583	3734	6905837	4959	2996444	5886	48 11 31.6	0.2	0.27	42936
9.0	6669669	10831	6958445	7574	3019273	8717	48 39 90.0	58.5	0.21	43437
9.5	6606276	7450	7010558	19694	3041888	1334	49 8 88.1	56.5	0.14	43936
10.0	6542408	3593	7062172	1315	3064287	3736	49 37 85.8	54.1	0.08	44433
10.5	6478069	9266	7113283	2433	3086468	5919	50 6 83.2	51.5	-0.01	44926
11.0	6413264	4472	7163887	3044	3108428	7881	50 35 80.3	48.5	+0.07	45417
11.5	6347998	9217	7213981	3145	3130167	19622	51 4 77.1	45.3	0.14	45906
12.0	6282275	3505	7263561	2733	3151683	1141	51 33 73.5	41.6	0.21	46392
12.5	6216191	7343	7312624	1803	3172975	2435	52 2 69.6	37.6	0.28	46876
13.0	6149479	10732	7361165	3052	3194040	3503	52 31 65.4	33.3	0.34	47356
13.5	6082413	3677	7409181	8376	3214877	4344	53 0 60.9	28.7	0.40	47832
14.0	6014909	6184	7456669	5872	3235485	4954	53 29 56.1	23.8	0.46	48304
14.5	5946970	8257	7503625	2836	3255862	5333	53 58 51.1	18.7	0.51	48772
15.0	5878601	9900	7550045	19264	3276006	5480	54 27 45.8	13.3	0.56	49236
15.5	5809808	11117	7595927	5154	3295916	5393	54 56 40.1	7.5	0.60	49697
16.0	5740395	1915	7641266	0501	3315589	5069	55 25 34.1	1.5	0.64	50153
16.5	5670968	2299	7686058	5301	3335026	4509	55 53 87.8	55.2	0.67	50603
17.0	5600933	2275	7730300	19551	3354224	3710	56 22 81.2	48.5	0.69	51049
17.5	5530493	1847	7773989	3249	3373180	2669	56 51 74.3	41.5	0.70	51491
18.0	5459654	11017	7817122	6391	3391894	1387	57 20 67.2	34.3	0.71	51927
18.5	5388422	9796	7859635	8972	3410366	19862	57 49 59.8	26.8	0.71	52358
19.0	5316802	8187	7901706	09922	3428594	8093	58 18 52.0	18.9	0.71	52784
19.5	5244800	6196	7943150	2444	3446576	6079	58 47 43.9	10.7	0.69	53205
20.0	5172421	3827	7984024	3328	3464310	3817	59 16 35.5	2.2	0.67	53621
20.5	5099671	1088	8024327	3640	3481796	1306	59 44 86.8	53.5	0.63	54030
21.0	5026555	7983	8064055	3377	3499031	8545	60 13 77.7	44.3	0.59	54434
21.5	4953079	4518	8103206	2537	3516015	5533	60 42 68.3	34.9	0.55	54833
22.0	4879250	10699	8141776	1116	3532747	2269	61 11 58.6	25.1	0.50	55227
22.5	4805074	6534	8179762	9111	3549226	8751	61 40 48.5	14.9	0.45	55615
23.0	4730555	2025	8217161	6519	3565449	4978	62 9 38.1	4.4	0.39	55998
23.5	4655700	7180	8253971	3339	3581417	0950	62 37 87.3	53.5	0.33	56375
24.0	4580515	2005	8290190	19568	3597128	6665	63 6 76.2	42.3	0.27	56746
24.5	4505005	6505	8325816	5204	3612582	2123	63 35 64.7	30.7	0.21	57113
25.0	4429175	10685	8360847	0245	3627777	7322	64 4 52.9	18.8	0.14	57475
25.5	4353032	4552	8395280	4688	3642713	2262	64 33 40.7	6.6	0.07	57831
26.0	4276581	8111	8429112	8530	3657390	6943	65 1 88.2	54.0	+0.01	58182
26.5	4199829	11369	8462342	1770	3671806	1363	65 30 75.3	41.0	-0.05	58529
27.0	4122782	4332	8494969	4407	3685950	5520	65 59 62.1	27.7	0.11	58871
27.5	4045446	7006	8526991	6440	3699849	9414	66 28 48.5	14.0	0.16	59208
28.0	3967826	9395	8558405	7865	3713477	3047	66 57 34.5	0.0	0.21	59541
28.5	3889928	11507	8589210	8680	3726841	6415	67 25 80.2	45.5	0.25	59870
29.0	3811758	3346	8619405	8886	3739940	9518	67 54 65.6	30.8	0.28	60195
29.5	3733321	4919	8648989	8481	3752774	2357	68 23 50.7	15.8	0.31	60516
30.0	3654624	6231	8677959	7462	3765343	4931	69 52 35.5	0.5	0.33	60833
30.5	3575672	7289	8706313	5827	3777645	7237	69 20 79.9	44.9	0.34	61146
31.0	3496469	8095	8734049	3574	3789680	9276	69 49 64.0	28.9	0.35	61456
31.5	3417021	8656	8761167	0703	3801445	1046	70 18 47.8	12.6	0.35	61762
June 1.0	3337335	8979	8787666	7213	3812941	2547	70 46 91.3	56.0	0.34	62065
1.5	3257415	9068	8813545	3103	3824168	3779	71 15 74.6	39.2	0.33	62365
2.0	3177267	8928	8838802	8371	3835127	4743	71 44 57.6	22.1	0.31	62661
2.5	+3096897	8567	+8863435	3016	+3845816	5437	72 13 40.3	4.7	-0.28	62955

NOTE.—The accented letters correspond to the mean equinox and equator of January 0<sup>th</sup>.

Date	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
1879.											
June 3.0	+3016310	7989	+8887444	7037	+3856235	5861	72° 41' 82.7	47.0	-0.25	63246	
3.5	2935512	7199	8910827	0431	3866383	6014	73 10 64.8	29.0	0.20	63534	
4.0	2854509	6205	8933582	3198	3876259	5895	73 39 46.7	10.8	0.15	63818	
4.5	2773306	5011	8955708	5336	3885863	5504	74 7 88.3	52.4	0.10	64099	
5.0	2691908	3631	8977203	6843	3895194	4840	74 36 69.8	33.8	-0.04	64377	
5.5	2610320	2041	8998066	7718	3904249	3900	75 5 51.1	15.0	+0.02	64652	
6.0	2528547	0276	9018296	7960	3913030	2686	75 33 92.2	56.0	0.09	64923	
6.5	2446594	8331	9037891	7567	3921536	1197	76 2 73.0	36.7	0.15	65191	
7.0	2364467	6212	9056851	6540	3929763	9432	76 31 53.6	17.3	0.22	65456	
7.5	2282171	3924	9075174	4875	3937718	7390	76 59 94.2	57.7	0.30	65717	
8.0	2199711	1472	9092859	2572	3945395	5072	77 28 74.6	38.0	0.37	65975	
8.5	2117093	8862	9109904	9630	3952794	2477	77 57 54.8	18.1	0.44	66230	
9.0	2034322	6098	9126308	6047	3959915	9604	78 25 94.9	58.1	0.50	66480	
9.5	1951404	3188	9142609	1820	3966756	6450	78 54 75.0	38.2	0.56	66725	
10.0	1868345	0136	9157186	6950	3973319	3019	79 23 54.9	18.0	0.62	66967	
10.5	1785151	6949	9171658	1435	3979601	9307	79 51 94.7	57.7	0.67	67205	
11.0	1701827	3632	9185484	5274	3985602	5314	80 20 73.9	37.2	0.72	67440	
11.5	1618380	0192	9198663	8666	3991322	1039	80 49 53.9	16.7	0.77	67667	
12.0	1534814	6633	9211194	1010	3996760	6483	81 17 93.4	56.1	0.81	67890	
12.5	1451137	2963	9223075	2904	4001916	1645	81 46 72.8	35.4	0.84	68109	
13.0	1367354	9187	9234305	4148	4006789	6524	82 15 52.0	14.5	0.86	68323	
13.5	1283470	5309	9244882	4738	4011379	1120	82 43 91.2	53.6	0.87	68531	
14.0	1199492	1337	9254805	4674	4015686	5433	83 12 70.3	32.6	0.87	68733	
14.5	1115425	7277	9264074	3957	4019707	9460	83 41 49.3	11.5	0.87	68930	
15.0	1031275	3133	9272686	2583	4023442	3201	84 9 88.2	50.3	0.86	69121	
15.5	0947049	8913	9280613	0554	4026893	6658	84 38 67.0	29.0	0.85	69306	
16.0	0862753	4623	9287943	7868	4030060	9831	85 7 45.7	7.6	0.83	69485	
16.5	0778394	0270	9294586	4525	4032941	2718	85 35 84.4	46.2	0.80	69658	
17.0	0693978	5860	9300570	0523	4035536	5320	86 4 63.0	24.7	0.77	69825	
17.5	0609512	1400	9305896	5863	4037845	7635	86 33 41.4	3.0	0.73	69985	
18.0	0525002	6895	9310563	0544	4039867	9663	87 1 79.8	41.3	0.68	70139	
18.5	0440453	2351	9314570	4565	4041602	1405	87 30 58.1	19.5	0.63	70286	
19.0	0355873	7776	9317916	7926	4043051	2861	87 58 96.3	57.6	0.57	70427	
19.5	0271267	3175	9320601	0625	4044213	4029	88 27 74.3	35.6	0.51	70561	
20.0	0186641	8554	9322626	2664	4045089	4911	88 56 52.2	13.4	0.45	70689	
20.5	0102002	3920	9323990	4043	4045677	5506	89 24 90.0	51.1	0.39	70811	
21.0	+0017358	9281	9324694	4762	4045978	5814	89 53 67.8	28.8	0.32	70925	
21.5	-0067285	5357	9324737	4819	4045994	5836	90 22 45.4	6.3	0.25	71033	
22.0	0151921	9989	9324120	4217	4045722	5570	90 50 82.8	43.6	0.18	71135	
22.5	0236542	4606	9322843	2955	4045164	5019	91 19 60.1	20.8	0.12	71231	
23.0	0321143	9203	9320906	1033	4044320	4182	91 47 97.2	57.8	0.06	71320	
23.5	0405718	3774	9318310	8452	4043191	3059	92 16 74.2	34.7	+0.01	71404	
24.0	0490260	8312	9315057	5214	4041776	1651	92 45 51.1	11.5	-0.04	71482	
24.5	0574765	2813	9311147	1319	4040077	9959	93 13 87.9	48.2	0.09	71554	
25.0	0659226	7270	9306580	6767	4038093	7982	93 42 64.5	24.8	0.13	71620	
25.5	0743637	1677	9301352	1560	4035825	5720	94 11 41.0	1.2	0.16	71681	
26.0	0827992	6029	9295480	5697	4033273	3175	94 39 77.4	37.5	0.19	71737	
26.5	0912284	0318	9288948	9180	4030437	0346	95 8 53.7	13.7	0.21	71787	
27.0	0996508	4539	9281761	2009	4027317	7233	95 36 89.8	49.7	0.22	71832	
27.5	1080657	8685	9273920	4183	4023915	3838	96 5 65.9	25.7	0.22	71872	
28.0	1164726	2751	9265423	5701	4020230	0160	96 34 41.8	1.5	0.22	71908	
28.5	1248710	6732	9256280	6574	4016263	6200	97 2 77.6	37.2	0.21	71938	
29.0	1332603	0623	9246485	6795	4012014	1958	97 31 53.3	12.8	0.19	71964	
29.5	1416399	4417	9236043	6368	4007485	7436	97 59 88.9	48.4	0.16	71987	
30.0	1500094	8110	9224955	5296	4002676	2634	98 28 64.5	23.9	0.13	72006	
30.5	1583682	1696	9213222	3579	3997587	7552	98 56 100.0	59.3	0.10	72021	
July 1.0	1667158	5170	9200845	1218	3992218	2190	99 26 75.5	34.7	0.06	72032	
1.5	1750516	8526	9187824	8212	3986569	6548	99 54 50.9	10.0	-0.01	72040	
2.0	1833749	1758	9174160	4564	3980641	0627	100 22 86.3	45.3	+0.05	72044	
2.5	1916851	4858	9158853	0273	3974436	4429	100 51 61.6	20.5	0.11	72044	
3.0	-1999817	7823	+9144904	5340	+3967953	7954	101 19 96.8	55.6	+0.17	72040	

NOTE.—: denotes a change in the preceding figure.

Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1879.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. — $\rho$ .
July 3.5	—2082642	0647	+9129314	9766	+3961193	1201	101 48 72.1	30.8	+0.24	0.00
4.0	2165320	3325	.9113084	3552	.3954157	4171	102 17 47.4	6.0	0.31	72021
4.5	2247847	5851	.9096216	6700	.3946843	6865	102 45 82.7	41.3	0.38	72005
5.0	2330218	8222	.9078710	9210	.3939252	9292	103 14 58.1	16.6	0.45	71986
5.5	2412428	0431	.9060569	1085	.3931384	1421	103 42 93.6	52.0	0.52	71962
6.0	2494472	2475	.9041793	2325	.3923240	3284	104 11 69.1	27.4	0.58	71937
6.5	2576343	4346	.9022384	2932	.3914821	4873	104 40 44.6	2.8	0.64	71906
7.0	2658036	6039	.9002343	2907	.3906127	6187	105 8 80.1	38.2	0.70	71872
7.5	2739544	7547	.8981671	2251	.3897160	7227	105 37 55.8	13.8	0.75	71834
8.0	2820662	8866	.8960369	0965	.3887919	7993	106 5 91.5	49.4	0.80	71792
8.5	2901985	9989	.8938438	9050	.3878405	8487	106 34 67.3	25.1	0.85	71746
9.0	2982907	0912	.8915877	6506	.3868618	8708	107 3 43.3	1.0	0.89	71696
9.5	3063623	1629	.8892690	3335	.3858559	8656	107 31 79.4	37.0	0.92	71640
10.0	3144127	2134	.8868875	9536	.3848228	8332	108 0 55.6	13.1	0.95	71580
10.5	3224414	2422	.8844435	5113	.3837626	7738	108 28 91.9	49.3	0.97	71516
11.0	3304479	2489	.8819374	0067	.3826753	6873	108 57 68.3	25.6	0.98	71447
11.5	3384315	2327	.8793689	4399	.3815609	5736	109 26 44.9	2.1	0.98	71373
12.0	3463917	1931	.8767385	8111	.3804195	4329	109 54 81.6	38.7	0.97	71294
12.5	3543279	1295	.8740460	1204	.3792512	2654	110 23 58.5	15.5	0.95	71209
13.0	3622394	0412	.8712919	3678	.3780560	0710	110 51 95.6	52.5	0.93	71119
13.5	3701257	9277	.8684760	5535	.3768340	8497	111 20 72.8	29.7	0.90	71022
14.0	3779862	7885	.8655987	6778	.3755853	6018	111 49 50.1	6.9	0.86	70920
14.5	3858202	6227	.8626601	7400	.3743100	3273	112 17 87.6	44.3	0.82	70812
15.0	3936271	4299	.8596603	7428	.3730082	0263	112 46 65.3	21.9	0.78	70698
15.5	4014063	2094	.8565996	6837	.3716800	6988	113 14 103.1	59.6	0.73	70577
16.0	4091573	9608	.8534782	5639	.3703253	3448	113 43 81.0	37.4	0.67	70450
16.5	4168795	6833	.8502963	3836	.3689444	9647	114 12 59.0	15.3	0.61	70317
17.0	4245722	3764	.8470541	1431	.3675373	5584	114 40 97.2	53.4	0.55	70178
17.5	4322349	0395	.8437518	8424	.3661041	1259	115 9 75.5	31.6	0.49	70032
18.0	4398671	6721	.8403897	4819	.3646449	6675	115 38 53.9	9.9	0.42	69879
18.5	4474682	2736	.8369681	0620	.3631599	1832	116 6 92.5	48.4	0.36	69720
19.0	4550376	8433	.8334871	5827	.3616491	6733	116 35 71.3	27.2	0.29	69555
19.5	4625746	3809	.8299470	0443	.3601127	1376	117 4 50.1	5.9	0.23	69384
20.0	4700788	8856	.8263480	4469	.3585509	5765	117 32 89.0	44.7	0.16	69206
20.5	4775494	3567	.8226905	7910	.3569637	9901	118 1 68.0	23.6	0.10	69022
21.0	4849859	7937	.8189747	0768	.3553513	3785	118 30 47.2	2.7	+0.05	68831
21.5	4923879	1962	.8152010	3047	.3537138	7417	118 58 86.5	41.9	0.00	68634
22.0	4997549	5638	.8113696	4749	.3520512	0799	119 27 65.9	21.2	—0.04	68431
22.5	5070863	8957	.8074808	5877	.3503637	3932	119 56 45.4	0.6	0.08	68222
23.0	5143815	1915	.8035349	6434	.3486515	6818	120 24 85.1	40.2	0.11	68007
23.5	5216400	4506	.7995323	6424	.3469147	9458	120 53 64.8	19.9	0.13	67787
24.0	5288613	6725	.7954732	5849	.3451533	1852	121 21 104.6	59.7	0.15	67562
24.5	5360448	8564	.7913581	4714	.3433675	4001	121 50 84.5	39.5	0.16	67330
25.0	5431900	0025	.7871871	3020	.3415575	5908	122 19 64.6	19.5	0.17	67093
25.5	5502965	1097	.7829606	0771	.3397236	7577	122 47 104.7	59.5	0.16	66852
26.0	5573639	1778	.7786789	7970	.3378659	9008	123 16 85.0	39.7	0.15	66606
26.5	5643916	2062	.7743423	4620	.3359845	0201	123 45 65.4	20.0	0.13	66355
27.0	5713790	1943	.7699513	0726	.3340795	1158	124 14 45.9	0.4	0.11	66099
27.5	5783257	1417	.7655061	6290	.3321510	1881	124 42 86.5	40.9	0.07	65839
28.0	5852314	0482	.7610071	1316	.3301992	2371	125 11 67.3	21.6	—0.03	65575
28.5	5820955	9131	.7564546	5807	.3282241	2627	125 40 48.2	2.5	+0.02	65306
29.0	5889176	7360	.7518491	9767	.3262260	2653	126 8 89.2	43.5	0.07	65034
29.5	5956972	5164	.7471907	3199	.3242050	2451	126 37 70.4	24.6	0.13	64759
30.0	6124339	2539	.7424799	6107	.3221612	2021	127 6 51.8	5.9	0.19	64480
30.5	6191273	9481	.7377169	8492	.3200948	1364	127 34 93.3	47.3	0.25	64197
31.0	6257769	5986	.7329021	0350	.3180060	0484	128 3 75.0	28.9	0.31	63911
31.5	6323823	9049	.7280358	1712	.3158949	9381	128 32 57.0	10.8	0.38	63623
Aug. 1.0	6389431	7066	.7231182	2552	.3137615	8055	129 0 99.1	52.8	0.44	63331
1.5	6454588	2832	.7181498	2883	.3116061	6508	129 29 81.4	35.0	0.51	63036
2.0	6519290	7544	.7131309	2709	.3094289	4743	129 58 63.9	17.5	0.58	62738
2.5	—6583533	1796	+7080618	2033	+3072298	2760	130 27 46.6	0.1	+0.64	62438

NOTE.—The accented letters correspond to the mean equinox and equator of January 0<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup>.

# SUN'S COORDINATES, 1879. 395

Data.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1879.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Aug. 3.0	-.6647312	5585	+.7029428	.0858	+.3050090	0560	130° 55' 89.6	43.1	+0.70	0.00
3.5	.6710624	.8907	.6977743	9188	.3027667	8144	131 24 72.9	26.3	0.76	61827
4.0	.6773463	1756	.6925565	7025	.3005029	5513	131 53 56.5	9.8	0.81	61517
4.5	.6835826	4129	.6872897	4372	.2982179	2671	132 21 100.3	53.5	0.85	61204
5.0	.6897709	6023	.6819743	1233	.2959118	9618	132 50 84.4	37.5	0.88	60888
5.5	.6969107	7431	.6766106	7611	.2935847	6354	133 19 68.8	21.8	0.91	60569
6.0	.7029015	.8350	.6711988	3507	.2912368	2882	133 48 53.5	6.5	0.94	60246
6.5	.7080428	.8774	.6657394	8928	.2888682	9204	134 16 98.6	51.5	0.96	59920
7.0	.7140343	.8700	.6602327	3876	.2864700	5319	134 45 84.0	36.9	0.98	59590
7.5	.7199754	8122	.6546792	8355	.2840693	1229	135 14 69.7	22.5	0.98	59257
8.0	.7258657	7037	.6490790	2367	.2816393	6036	135 43 55.7	8.5	0.98	58920
8.5	.7317048	5440	.6434326	5917	.2791893	2444	136 11 102.1	54.8	0.96	58579
9.0	.7374922	3326	.6377404	9009	.2767194	7752	136 40 88.8	41.4	0.94	58235
9.5	.7432276	0692	.6320025	1644	.2742297	2862	137 9 75.9	28.4	0.92	57887
10.0	.7489105	7533	.6262195	3828	.2717202	7774	137 38 63.4	15.8	0.89	57534
10.5	.7545403	3843	.6203916	5563	.2691913	2492	138 7 51.3	3.6	0.85	57176
11.0	.7601167	.9620	.6145193	6854	.2666430	7016	138 35 99.5	51.8	0.80	56814
11.5	.7656391	4856	.6086029	7704	.2640757	1350	139 4 88.0	40.2	0.75	56448
12.0	.7711071	.9549	.6026429	8117	.2614894	5494	139 33 76.9	29.1	0.70	56078
12.5	.7765203	3694	.5966397	9099	.2588844	9451	140 2 66.2	18.3	0.64	55702
13.0	.7818782	7286	.5905937	7652	.2562607	3221	140 31 55.8	7.9	0.57	55321
13.5	.7871804	0321	.5845053	6781	.2536186	6807	140 59 105.8	57.8	0.51	54935
14.0	.7924264	2795	.5783748	5489	.2509583	.0211	141 28 96.2	48.1	0.44	54544
14.5	.7976154	4701	.5722028	3782	.2482799	3434	141 57 86.9	38.7	0.37	54147
15.0	.8027480	6038	.5659896	1663	.2455837	6479	142 26 77.9	29.6	0.30	53745
15.5	.8078229	6801	.5597358	9138	.2428698	9347	142 55 69.3	20.0	0.24	53338
16.0	.8128399	6985	.5534417	6210	.2401385	2040	143 24 61.1	12.7	0.18	52926
16.5	.8177927	6587	.5471078	2884	.2373899	4561	143 53 53.3	4.8	0.12	52509
17.0	.8226989	5604	.5407345	9164	.2346243	6912	144 21 105.7	57.2	0.07	52096
17.5	.8275402	4031	.5343225	5056	.2318419	9095	144 50 98.5	49.9	+0.02	51658
18.0	.8323221	1865	.5278721	.0564	.2290429	1111	145 19 91.7	43.1	-0.03	51225
18.5	.8370442	.9101	.5213839	5694	.2262275	2964	145 48 85.3	36.6	0.08	50787
19.0	.8417061	5735	.5148585	.0452	.2233959	4655	146 17 79.2	30.4	0.12	50343
19.5	.8463074	1763	.5082963	4840	.2205484	6186	146 46 73.3	24.4	0.15	49904
20.0	.8508477	7182	.5016976	8866	.2176851	7559	147 15 67.7	18.8	0.17	49440
20.5	.8553268	1988	.4950632	2533	.2148062	8777	147 44 62.4	13.4	0.18	48982
21.0	.8597443	6179	.4883933	5846	.2119121	9843	148 13 57.5	8.5	0.19	48519
21.5	.8641000	9752	.4816885	8810	.2090030	0758	148 42 52.9	3.8	0.19	48051
22.0	.8683934	2702	.4749496	1432	.2060789	1523	149 10 108.6	59.4	0.18	47579
22.5	.8726243	5027	.4681769	3716	.2031403	2143	149 39 104.5	55.3	0.16	47103
23.0	.8767922	6722	.4613711	5669	.2001872	2618	150 8 100.8	51.6	0.13	46623
23.5	.8808971	7787	.4545323	7292	.1972201	2953	150 37 97.4	48.1	0.10	46138
24.0	.8849385	8218	.4476611	8591	.1942390	3148	151 6 94.3	44.9	0.07	45650
24.5	.8889163	8012	.4407580	9571	.1912442	3206	151 35 91.5	42.0	-0.02	45159
25.0	.8928303	7169	.4338237	.0238	.1882358	3128	152 4 89.0	39.5	+0.03	44665
25.5	.8966801	5684	.4265585	.0596	.1852140	2916	152 33 86.8	37.2	0.08	44167
26.0	.9004656	3556	.4198630	.0651	.1821700	2572	153 2 85.0	35.4	0.14	43666
26.5	.9041864	0781	.4128378	.0409	.1791311	2099	153 31 83.5	33.8	0.20	43163
27.0	.9078424	7358	.4057833	9874	.1760705	1499	154 0 82.3	32.6	0.27	42658
27.5	.9114332	3283	.3987001	9052	.1729974	.0774	154 29 81.5	31.7	0.33	42149
28.0	.9149585	8554	.3915885	7946	.1699120	9925	154 58 81.0	31.2	0.40	41638
28.5	.9184182	3168	.3844492	6562	.1668146	8957	155 27 80.9	31.0	0.47	41126
29.0	.9218119	7123	.3772825	4904	.1637054	7871	155 56 81.1	31.1	0.54	40612
29.5	.9251396	0418	.3700891	2977	.1605845	6668	156 25 81.7	31.6	0.60	40096
30.0	.9284010	3050	.3628692	.0789	.1574520	5348	156 54 82.7	32.6	0.66	39578
30.5	.9315959	5017	.3556236	8342	.1543084	3919	157 23 84.1	33.9	0.71	39059
31.0	.9347242	6318	.3483526	5641	.1511537	2376	157 52 85.8	35.6	0.76	38539
31.5	.9377854	6948	.3410568	2692	.1479883	.0727	158 21 87.9	37.6	0.81	38017
Sept. 1.0	.9407785	6908	.3337364	9496	.1448123	8972	158 50 90.5	40.2	0.85	37494
1.5	.9437061	6192	.3263923	6063	.1416253	7114	159 19 93.5	43.1	0.89	36969
2.0	-.9465650	4800	+.3190245	2393	+.1384292	5152	159 48 96.9	46.4	+0.92	36443

NOTE. — : denotes a change in the preceding figure.

Date. 1879.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. — $\rho$ .
Sept. 2.5	—9493561	2730	+3116339	8495	+1352225	3090	160 17 100.7	50.2	+0.94	0.00 35916
3.0	.9520789	9977	.3042206	4369	.1320060	0930	160 46 105.1	54.5	0.96	35387
3.5	.9547335	6542	.2967854	40025	.1287799	8673	161 15 110.0	59.3	0.96	34857
4.0	.9573195	2421	.2893266	5465	.1255444	6322	161 45 55.3	4.6	0.95	34325
4.5	.9598367	7612	.2818508	0694	.1222997	3879	162 14 61.0	10.2	0.94	33792
5.0	.9622849	2113	.2743525	5718	.1190460	1349	162 43 67.2	16.4	0.93	33257
5.5	.9646638	5921	.2668342	0542	.1157836	8730	163 12 74.0	23.1	0.91	32721
6.0	.9669733	9038	.2592964	5171	.1125127	6026	163 41 81.2	30.3	0.88	32183
6.5	.9692130	1452	.2517395	9609	.1092336	3239	164 10 88.9	37.9	0.85	31643
7.0	.9713827	3169	.2441642	3862	.1059465	0372	164 39 97.2	46.2	0.81	31101
7.5	.9734823	4185	.2365708	7935	.1026516	7428	165 8 106.0	54.9	0.76	30556
8.0	.9755114	4496	.2292960	1833	.0993491	4408	165 38 55.3	4.2	0.70	30009
8.5	.9774701	4103	.2213322	5561	.0960392	1313	166 7 65.1	13.9	0.64	29460
9.0	.9793580	3002	.2136880	9125	.0927221	8146	166 36 75.4	24.2	0.58	28909
9.5	.9811750	1192	.2060279	2530	.0893981	4911	167 5 86.3	35.0	0.52	28356
10.0	.9829207	8669	.1983526	5783	.0860674	1609	167 34 97.7	46.4	0.45	27800
10.5	.9845951	5433	.1906624	8886	.0827305	8242	168 3 109.6	58.2	0.39	27242
11.0	.9861978	1481	.1829581	1848	.0793871	4813	168 33 62.1	10.7	0.32	26680
11.5	.9877288	6811	.1752401	4673	.0760379	1325	169 2 75.1	23.6	0.26	26115
12.0	.9891877	1421	.1675090	7367	.0726830	7780	169 31 88.6	37.1	0.19	25547
12.5	.9905744	5309	.1597654	9936	.0693228	4182	170 0 102.6	51.0	0.13	24976
13.0	.9918888	8473	.1520100	2387	.0659575	0533	170 30 57.1	5.5	0.07	24402
13.5	.9931307	0913	.1442433	4724	.0625874	6836	170 59 72.1	20.4	+0.02	23824
14.0	.9942999	2626	.1364659	6954	.0592126	3092	171 28 87.6	35.9	—0.02	23243
14.5	.9953963	3611	.1286784	9083	.0558334	9304	171 57 103.6	51.8	0.06	22658
15.0	.9964198	3867	.1208815	1118	.0524500	5473	172 27 60.2	8.4	0.10	22070
15.5	.9973703	3393	.1130757	3064	.0490629	1606	172 56 77.2	25.3	0.13	21479
16.0	.9982477	2188	.1052616	4927	.0456722	7702	173 25 94.6	42.7	0.16	20885
16.5	.9990519	0251	.0974399	6714	.0422783	3766	173 55 52.5	0.5	0.18	20288
17.0	.9997829	7583	.0896111	8429	.0388814	9800	174 24 70.9	18.9	0.19	19687
17.5	1.0004405	4180	.0817758	0079	.0354818	5807	174 53 89.7	37.6	0.18	19083
18.0	1.0010246	0043	.0739347	1671	.0320796	1788	175 22 109.0	56.9	0.17	18477
18.5	1.0015353	5171	.0660883	3210	.0286752	7747	175 52 68.8	16.6	0.16	17868
19.0	1.0019723	9563	.0582371	4700	.0252687	3685	176 21 89.1	36.8	0.14	17256
19.5	1.0023359	3220	.0503819	6151	.0218603	9604	176 50 109.7	57.4	0.11	16642
20.0	1.0026259	6142	.0425232	7566	.0184504	5508	177 20 70.8	18.0	0.08	16026
20.5	1.0028424	8328	.0346617	8953	.0150395	1402	177 49 92.4	40.0	—0.04	15407
21.0	1.0029852	9778	.0267980	0318	.0116276	7285	178 19 54.3	1.9	0.00	14786
21.5	1.0030544	0491	.0189327	1667	.0082152	3164	178 48 76.6	24.1	+0.06	14163
22.0	1.0030499	0468	.0110665	3006	.0048023	9038	179 17 99.4	46.9	0.12	13539
22.5	1.0029719	9710	+0.0031998	4340	+0.0013894	4911	179 47 62.6	10.0	0.18	12913
23.0	1.0028201	8214	—0.0046666	4323	—0.0020235	9216	180 16 86.2	33.6	0.24	12286
23.5	1.0025950	5985	—0.0125323	2979	—0.0054360	3339	180 45 110.3	57.6	0.31	11658
24.0	1.0022963	3020	.0203968	1623	.0088481	7458	181 15 74.8	22.1	0.38	11029
24.5	1.0019242	9321	.0282596	0250	.0122594	1569	181 44 99.7	46.9	0.45	10400
25.0	1.0014787	4888	.0361200	8853	.0156697	5670	182 14 65.0	12.2	0.52	09771
25.5	1.0009599	9722	.0439775	7427	.0190787	9758	182 43 90.8	37.9	0.59	09142
26.0	1.0003677	3822	.0518315	5967	.0224862	3831	183 13 57.1	4.2	0.65	08513
26.5	.9997023	7190	.0596814	4466	.0258920	7885	183 42 83.8	30.8	0.71	07883
27.0	.9989636	9825	.0675265	2917	.0292957	1923	184 11 111.0	58.0	0.76	07253
27.5	.9981517	1728	.0753665	1318	.0326972	5936	184 41 78.6	25.5	0.81	06625
28.0	.9972667	2900	.0832006	9659	.0360962	9924	185 10 106.7	53.6	0.85	05998
28.5	.9963086	3341	.0910285	7938	.0394925	3886	185 40 75.2	22.0	0.89	05371
29.0	.9952773	3051	.0988494	6148	.0428859	7819	186 9 104.2	51.0	0.92	04744
29.5	.9941731	2031	.1066631	4286	.0462761	1719	186 39 73.7	20.4	0.94	04118
30.0	.9929959	0281	.1144689	2345	.0496628	5585	187 8 103.7	50.4	0.96	03493
30.5	.9917459	7803	.1222662	0320	.0530460	9416	187 38 74.2	20.8	0.97	02870
Oct. 1.0	.9904230	4597	.1300546	8206	.0564253	3208	188 7 105.2	51.8	0.98	02248
1.5	.9890274	0663	.1378335	5997	.0598006	6960	188 37 76.8	23.3	0.98	01627
2.0	.9875591	6002	.1456023	3687	.0631716	0669	189 6 108.9	55.4	0.97	01007
2.5	—9860181	0614	—1533606	1272	—0.0665381	4333	189 36 81.5	27.9	+0.95	00388

NOTE.—The accented letters correspond to the mean equinox and equator of January 0.0.

# SUN'S COÖRDINATES, 1879. 397

Data	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1879.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Oct. 3.0	—9844045	4501	—1611077	8745	—0698997	7949	190° 6' 54".7	1".1	+0".93	9.99
3.5	9827184	7662	1688432	6102	0732563	1514	190 35 88.4	34.7	0.89	99770
4.0	9809597	0008	1765666	3338	0766077	5026	191 5 62.7	9.0	0.85	99153
4.5	9791285	1808	1842771	0446	0799535	8484	191 34 97.5	43.7	0.80	98537
5.0	9772249	2795	1919744	7422	0832934	1882	192 4 72.9	19.1	0.75	97922
5.5	9752491	3059	1996577	4258	0866274	5222	192 33 108.9	55.0	0.69	97308
6.0	9732011	2602	2073267	0951	0899552	8500	193 3 85.4	31.5	0.63	96694
6.5	9710810	1423	2149806	7494	0932765	1713	193 33 62.5	8.5	0.57	96081
7.0	9688888	9524	2226190	3880	0965912	4860	194 2 100.3	46.3	0.50	95469
7.5	9666246	6905	2302412	0106	0998988	7936	194 32 78.7	24.7	0.44	94857
8.0	9642885	3566	2378466	6164	1031992	0940	195 2 57.6	3.5	0.37	94246
8.5	9618806	9510	2454347	2049	1064920	3868	195 31 97.1	43.0	0.30	93635
9.0	9594010	4736	2530048	7754	1097770	6719	196 1 77.1	22.9	0.24	93025
9.5	9568498	9248	2605564	3274	1130539	9488	196 31 57.7	3.5	0.18	92414
10.0	9542272	3043	2680888	8602	1163224	2174	197 0 98.9	44.6	0.12	91803
10.5	9515332	6125	2756016	3735	1195824	4774	197 30 80.7	26.4	0.06	91192
11.0	9487679	8494	2830942	8666	1228336	7287	198 0 63.1	8.7	+0.01	90581
11.5	9459315	0153	2905659	3388	1260757	9709	198 29 106.0	51.6	—0.03	89969
12.0	9430243	1103	2980161	7895	1293085	2038	198 59 89.5	35.0	0.07	89356
12.5	9400464	1346	3054442	2182	1325317	4271	199 29 73.6	19.1	0.10	88743
13.0	9369961	0885	3128497	6243	1357450	6405	199 59 58.2	3.6	0.13	88130
13.5	9338795	9722	3202318	0070	1389482	8438	200 28 103.3	48.7	0.15	87516
14.0	9306908	7857	3275899	3657	1421409	0366	200 58 89.0	34.3	0.16	86901
14.5	9274322	5293	3349235	6999	1453229	2187	201 28 75.2	20.5	0.16	86286
15.0	9241039	2032	3422319	0089	1484940	3900	201 58 61.8	7.0	0.16	85670
15.5	9207061	8076	3495147	2923	1516538	5499	202 27 108.9	54.1	0.15	85053
16.0	9172390	3427	3567710	5493	1548022	6984	202 57 96.5	41.6	0.13	84436
16.5	9137030	8089	3640005	7793	1579389	8353	203 27 84.8	29.8	0.11	83819
17.0	9100982	2063	3712025	9822	1610636	9602	203 57 73.6	18.5	0.08	83201
17.5	9064249	5352	3783764	1568	1641762	0730	204 27 62.7	7.6	—0.04	82583
18.0	9026835	7960	3855217	3028	1672764	1734	204 56 112.3	57.1	+0.01	81964
18.5	8988742	9889	3926376	4197	1703639	2611	205 26 102.4	47.2	0.06	81345
19.0	8949974	1143	3997240	5067	1734383	3357	205 56 92.9	37.6	0.12	80726
19.5	8910534	1725	4067799	5634	1764995	3971	206 26 83.8	28.5	0.18	80107
20.0	8870426	1639	4138050	5893	1795473	4451	206 56 75.2	19.8	0.24	79489
20.5	8829653	0888	4207988	5839	1825814	4794	207 26 67.1	11.6	0.31	78871
21.0	8788217	9473	4277605	5464	1856017	5000	207 56 59.3	3.8	0.37	78254
21.5	8746122	7400	4346896	4763	1886078	5064	208 25 111.9	56.3	0.44	77638
22.0	8703372	4672	4415858	3734	1915997	4986	208 55 105.0	49.3	0.51	77024
22.5	8659969	1291	4484486	2371	1945770	4762	209 25 98.6	42.9	0.57	76411
23.0	8615915	7258	4552773	0667	1975397	4391	209 55 92.6	36.8	0.63	75799
23.5	8571215	2580	4620715	8618	2004873	3870	210 25 87.0	31.2	0.69	75189
24.0	8525872	7258	4688306	6218	2034198	3198	210 55 81.9	26.0	0.74	74580
24.5	8479890	1298	4755542	3464	2063368	2371	211 25 77.1	21.1	0.78	73974
25.0	8433272	4701	4822416	0348	2092382	1388	211 55 72.7	16.7	0.84	73370
25.5	8386021	7472	4888926	6368	2121238	0247	212 25 68.8	12.8	0.88	72769
26.0	8338142	9614	4955067	3317	2149933	8945	212 55 65.3	9.2	0.91	72171
26.5	8289639	1133	5020829	8791	2178466	7482	213 25 62.2	6.0	0.94	71576
27.0	8240515	2029	5086213	4185	2206835	5855	213 55 59.6	3.3	0.96	70983
27.5	8190773	2308	5151212	9195	2235037	4061	214 25 57.5	1.2	0.97	70393
28.0	8140417	1973	5215825	3818	2263070	2098	214 54 115.8	59.4	0.97	69807
28.5	8089450	1028	5280043	8047	2290933	9965	215 24 114.4	58.0	0.97	69225
29.0	8037876	9474	5343864	1879	2318624	7669	215 54 113.5	57.0	0.96	68646
29.5	7985616	7316	5407281	5307	2346141	5181	216 24 113.2	56.7	0.94	68067
30.0	7932914	4354	5470292	8329	2373482	2526	216 54 113.3	56.7	0.92	67498
30.5	7879534	1195	5532890	0938	2400644	9692	217 24 113.8	57.1	0.89	66930
31.0	7825561	7242	5595071	3131	2427626	6679	217 54 114.8	58.0	0.86	66365
31.5	7770799	2501	5656832	4904	2454426	3483	218 24 116.3	59.4	0.81	65805
Nov. 1.0	7715850	7572	5718166	6250	2481041	0103	218 55 58.3	1.3	0.76	65249
1.5	7660118	1861	5779071	7167	2507470	6537	219 25 60.8	3.8	0.71	64696
2.0	7603807	5570	5839542	7650	2533711	2783	219 55 63.8	6.7	+0.65	64147

NOTE. — i denotes a change in the preceding figure.



Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1879.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. $= \rho$ .
Nov. 2.5	—7546919	8702	—5899573	7693	—2559761	8837	220 25 67.4	10.3	+0.59	9.99 63062
3.0	7489457	1260	5959162	7294	2585619	4700	220 55 71.5	14.3	0.52	62524
3.5	7431425	3248	6018301	6446	2611282	0368	221 25 76.0	18.8	0.45	61990
4.0	7372827	4670	6076987	5145	2636747	5838	221 55 81.0	23.7	0.58	61460
4.5	7313668	5531	6135215	3386	2662013	1109	222 25 86.6	29.2	0.31	60932
5.0	7253952	5835	6192980	164	2687079	6180	222 55 92.7	35.2	0.24	60408
5.5	7193683	5586	6250277	2474	2711942	1048	223 25 99.4	41.8	0.18	59888
6.0	7132865	4787	6307102	5313	2736602	5713	223 55 106.6	48.9	0.12	59371
6.5	7071502	3444	6363449	1674	2761054	0170	224 25 114.2	56.5	0.06	58856
7.0	7009598	1559	6419315	7534	2785297	4418	224 56 62.4	4.6	+0.01	58344
7.5	6947156	9137	6474695	2948	2809328	8455	225 26 71.1	13.3	—0.04	57836
8.0	6884180	6180	6529585	7852	2833145	2278	225 56 80.3	22.4	0.09	57330
8.5	6820676	2695	6583978	2259	2856746	5884	226 26 89.9	32.0	0.12	56825
9.0	6756648	8686	6637871	6166	2880130	9274	226 56 100.1	42.1	0.15	56323
9.5	6692101	4158	6691258	9568	2903295	2445	227 26 110.8	52.7	0.17	55824
10.0	6627039	9115	6744134	2459	2926237	5393	227 57 62.0	3.8	0.19	55327
10.5	6561466	3561	6796495	4835	2948956	8118	228 27 73.6	15.3	0.20	54832
11.0	6495389	7502	6848337	6692	2971449	0617	228 57 85.7	27.3	0.20	54340
11.5	6428813	0945	6899654	8024	2993715	2889	229 27 98.3	39.8	0.19	53850
12.0	6361744	3894	6950442	8828	3015751	4932	229 57 111.2	52.7	0.18	53361
12.5	6294186	6355	7000696	9098	3037555	6742	230 28 64.5	6.0	0.15	52874
13.0	6226143	8330	7050413	8830	3059125	8318	230 58 78.3	19.7	0.12	52389
13.5	6157621	9826	7099588	8021	3080461	9661	231 28 92.5	33.8	0.09	51907
14.0	6088626	0849	7148217	6666	3101559	0766	231 58 107.3	48.5	—0.05	51427
14.5	6019162	1403	7196296	4761	3122417	1631	232 29 62.3	3.4	0.00	50948
15.0	5949236	1495	7243820	2301	3143034	2255	232 59 77.7	18.7	+0.05	50471
15.5	5878852	1129	7290787	9285	3163409	2637	233 29 93.5	34.4	0.10	49996
16.0	5808016	0310	7337192	5707	3183541	2776	233 59 109.7	50.5	0.16	49525
16.5	5736734	9046	7383033	1565	3203428	2670	234 30 66.1	6.9	0.22	49056
17.0	5665011	7340	7428305	6834	3223067	2316	235 0 82.9	23.6	0.29	48589
17.5	5592854	5900	7473005	1571	3242457	1713	235 30 100.1	40.8	0.35	48124
18.0	5520270	2633	7517128	5712	3261596	0860	236 0 117.7	55.3	0.42	47663
18.5	5447265	9645	7560671	9272	3280485	9756	236 31 75.5	16.0	0.49	47206
19.0	5373845	6242	7603630	2248	3299120	8398	237 1 93.7	34.1	0.55	46751
19.5	5300016	2430	7646002	4638	3317501	6786	237 31 112.2	52.5	0.61	46299
20.0	5225782	8212	7687783	6437	3335626	4919	238 2 70.8	11.0	0.66	45851
20.5	5151150	3506	7728971	7643	3353493	2794	238 32 89.7	29.8	0.71	45408
21.0	5076125	8587	7769563	8253	3371102	0411	239 2 109.0	49.0	0.76	44968
21.5	5000713	3191	7809556	8264	3388452	7769	239 33 68.6	8.6	0.80	44532
22.0	4924290	7414	7848947	7674	3405542	4867	240 3 88.5	28.4	0.84	44100
22.5	4848754	1964	7887733	6478	3422370	1703	240 33 108.6	48.5	0.87	43674
23.0	4772219	4744	7925913	4677	3438934	8275	241 4 69.0	8.8	0.89	43252
23.5	4695320	7861	7963482	2265	3455234	4583	241 34 89.7	29.4	0.90	42834
24.0	4618065	0621	8000433	9239	3471268	0626	242 4 110.6	50.2	0.91	42421
24.5	4540459	3030	8036779	5600	3487036	6402	242 35 71.8	11.3	0.91	42015
25.0	4462508	5094	8072501	1341	3502536	1910	243 5 93.3	32.7	0.90	41614
25.5	4384216	6817	8107603	6463	3517768	7151	243 35 115.1	54.4	0.88	41218
26.0	4305589	8205	8142083	0963	3532730	2122	244 6 77.1	16.3	0.86	40820
26.5	4226634	9265	8175938	4838	3547422	6822	244 36 99.5	38.7	0.83	40444
27.0	4147355	0000	8209164	8084	3561841	1250	245 7 62.2	1.3	0.79	40066
27.5	4067759	0419	8241761	0701	3575985	5403	245 37 85.1	24.2	0.75	39693
28.0	3987851	0525	8273725	2685	3589854	9281	246 7 108.3	47.3	0.70	39326
28.5	3907638	0326	8305054	4034	3603449	2885	246 38 71.9	10.8	0.64	38966
29.0	3827124	9826	8335746	4746	3616767	6212	247 8 95.8	34.6	0.58	38612
29.5	3746316	9032	8365797	4818	3629809	9263	247 38 119.9	58.6	0.52	38264
30.0	3665219	7948	8395206	4248	3642571	2034	248 9 84.3	22.9	0.46	37922
30.5	3583839	6582	8423970	3033	3655054	4526	248 39 109.1	47.6	0.39	37586
Dec. 1.0	3502181	4946	8452088	1172	3667257	6738	249 10 74.2	12.6	0.32	37256
1.5	3420252	3020	8479556	8661	3679179	8669	249 40 99.6	37.9	0.26	36932
2.0	3338056	0837	8506373	5499	3690817	0317	250 11 65.4	3.7	0.19	36614
2.5	3255601	8395	8532535	1682	3702172	1681	250 41 91.5	29.7	+0.12	36302

NOTE.—The accented letters correspond to the mean equinox and equator of January 0<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup>.

Date 1879.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Dec. 3.0	—3172892	5698	—8558041	7209	—3713241	2759	251° 11' 117.9	56.0	+0.06	9.99 35995
3.5	3069936	2755	8582888	2078	3724026	3554	251 42 84.6	22.6	0.00	35695
4.0	3006738	9569	8607074	6296	3734522	4060	252 12 111.7	49.6	—0.06	35401
4.5	2923304	6146	8630597	9631	3744731	4278	252 43 79.1	16.9	0.11	35111
5.0	2839640	2493	8653453	2709	3754650	4207	253 13 106.8	44.5	0.15	34826
5.5	2755754	8618	8675641	4919	3764278	3845	253 44 74.8	12.4	0.19	34547
6.0	2671651	4526	8697158	6458	3773615	3192	254 14 103.2	40.7	0.22	34272
6.5	2587337	9223	8718002	7324	3782661	2248	254 45 71.8	9.3	0.24	34002
7.0	2502918	5715	8738171	7516	3791413	1010	255 15 100.7	38.1	0.26	33737
7.5	2418101	1009	8757663	7031	3799871	9478	255 46 70.0	7.3	0.27	33477
8.0	2333191	6109	8776477	5868	3808034	7651	256 16 99.7	36.8	0.28	33221
8.5	2248096	1024	8794611	4025	3815901	5528	256 47 69.5	6.6	0.28	32969
9.0	2162823	5761	8812062	1499	3823471	3108	257 17 99.6	36.6	0.27	32721
9.5	2077379	9327	8828829	9289	3830744	9391	257 48 70.0	6.9	0.25	32478
10.0	1991770	4727	8844910	4393	3837719	7376	258 18 100.8	37.6	0.23	32240
10.5	1906004	8971	8860302	9808	3844396	4063	258 49 71.7	8.5	0.19	32005
11.0	1820088	3064	8875005	4535	3850773	0450	259 19 102.9	39.5	0.15	31774
11.5	1734028	7013	8889016	8570	3856849	6537	259 50 74.3	10.8	0.11	31547
12.0	1647832	9826	8902334	1912	3862625	2323	260 20 105.9	42.3	0.06	31323
12.5	1561507	4509	8914958	4559	3868099	7807	260 51 77.6	13.9	—0.01	31103
13.0	1475061	8071	8926887	6512	3873272	2990	261 21 109.6	45.8	+0.05	30887
13.5	1388500	1518	8938120	7769	3878142	7871	261 52 81.8	17.9	0.11	30675
14.0	1301832	4858	8948656	8329	3882710	2450	262 22 114.2	50.2	0.17	30468
14.5	1215062	8096	8958493	8190	3886974	6724	262 53 86.7	22.6	0.24	30264
15.0	1128197	1238	8967631	7352	3890936	0697	263 23 119.3	55.1	0.31	30064
15.5	1041244	4293	8976069	5814	3894594	4366	263 54 92.2	27.9	0.38	29868
16.0	9548211	7267	8983807	3577	3897947	7730	264 25 65.2	0.8	0.44	29675
16.5	867107	9170	8990843	0637	3900997	0790	264 55 98.2	33.7	0.50	29487
17.0	7799339	3008	8997178	6996	3903742	3546	265 26 71.4	6.8	0.55	29303
17.5	6927214	5790	9002811	2654	3906183	5998	265 56 104.6	39.9	0.60	29124
18.0	6050440	8522	9007743	7611	3908320	8146	266 27 77.9	13.1	0.65	28950
18.5	518124	1212	9011972	1864	3910152	9989	266 57 111.2	46.3	0.69	28780
19.0	4330771	3864	9015499	5416	3911680	1528	267 28 84.6	19.6	0.73	28615
19.5	3433337	6486	9018324	9266	3912904	2763	267 58 118.1	53.0	0.76	28454
20.0	255979	9083	9020447	0414	3913823	3694	268 29 91.7	26.5	0.79	28299
20.5	0168555	1664	9021869	1861	3914435	4320	269 0 65.2	0.0	0.81	28151
21.0	—0081122	4236	9022589	2606	3914749	4642	269 30 98.8	33.5	0.82	28008
21.5	+0006315	3196	9022607	2649	3914756	4660	270 1 72.5	7.1	0.82	27869
22.0	0093747	0624	9021924	1992	3914459	4375	270 31 106.2	40.7	0.82	27736
22.5	0181167	8040	9020540	0633	3913859	3786	271 2 79.8	14.2	0.80	27610
23.0	0268569	5439	9018456	8575	3912955	2893	271 32 113.5	47.8	0.78	27490
23.5	0355946	2812	9015672	5817	3911749	1699	272 3 87.3	21.5	0.75	27376
24.0	0443291	0154	9012188	2359	3910240	0202	272 33 121.1	55.2	0.72	27269
24.5	0530599	7459	9008008	8204	3908428	8401	273 4 94.9	28.9	0.67	27169
25.0	0617864	4722	9003131	3353	3906314	6298	273 35 68.7	2.6	0.62	27076
25.5	0705079	1934	8997556	7804	3903898	3893	274 5 102.5	36.4	0.57	26989
26.0	0792238	9091	8991283	1560	3901179	1186	274 36 76.5	10.3	0.51	26908
26.5	0879335	6186	8984314	4614	3898159	8177	275 6 110.5	44.2	0.45	26835
27.0	0966363	3212	8976650	6976	3894837	4866	275 37 84.5	18.1	0.38	26770
27.5	1053314	0161	8968291	8643	3891214	1255	276 7 118.5	52.0	0.31	26711
28.0	1140182	7028	8959237	9615	3887289	7342	276 38 92.4	25.8	0.25	26659
28.5	1226962	3807	8949490	9894	3883064	3128	277 8 126.4	59.7	0.18	26615
29.0	1313648	0492	8939050	9480	3878538	8613	277 39 100.5	33.6	0.11	26578
29.5	1400233	7076	8927917	8373	3873711	3798	278 10 74.7	7.8	+0.04	26548
30.0	1486712	3555	8916093	6576	3868584	8683	278 40 109.0	42.0	—0.02	26526
30.5	1573078	9021	8903578	4087	3863157	3267	279 11 83.3	16.2	0.08	26510
31.0	1659325	6168	8890373	0908	3857430	7552	279 41 117.6	50.4	0.14	26501
31.5	1745446	2290	8876478	7040	3851404	1538	280 12 92.0	24.7	0.19	26499
32.0	+1831335	2280	8861894	2483	3845079	5225	280 42 126.5	59.1	—0.24	26503

NOTE.—: denotes a change in the preceding figure.

# 400 HELIOCENTRIC COÖRDINATES.

MERCURY.										
1879.	Julian Day.	<i>x</i> .	<i>y</i> .	<i>z</i> .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3} z$ .	$-\frac{x^2}{r^3} y$ .	$-\frac{y^2}{r^3} z$ .	
Jan.	0	240 7350	-0.1955	+0.2602	+0.0396	9.5170	127° 14.2	+5.35	- 7.12	-1.08
	5	7355	0.3135	0.1595	0.0415	9.5502	153 0.5	6.82	3.58	0.90
	10	7360	0.3802	+0.0322	0.0368	9.5841	175 2.1	6.54	- 0.56	0.63
	15	7365	0.3979	-0.1001	0.0272	9.6140	194 1.5	5.58	+ 1.40	0.38
	20	7370	0.3732	0.2222	+0.0147	9.6377	210 47.9	4.44	2.64	-0.18
Feb.	25	7375	0.3147	0.3245	-0.0008	9.6548	226 3.9	3.32	3.42	0.00
	30	7380	0.2310	0.4009	0.0132	9.6652	240 23.6	2.28	3.94	+0.13
	4	7385	0.1301	0.4475	0.0262	9.6690	254 15.5	1.25	4.29	0.25
	9	7390	-0.0196	0.4616	0.0373	9.6663	268 5.2	+0.19	4.51	0.37
	14	7395	+0.0925	0.4415	0.0456	9.6571	282 18.1	-0.96	4.60	0.48
March	19	7400	0.1969	0.3866	0.0503	9.6412	297 21.8	2.28	4.48	0.59
	24	7405	0.2837	0.2979	0.0506	9.6187	313 49.4	3.84	4.05	0.68
	1	7410	0.3411	0.1788	0.0456	9.5898	332 21.7	5.65	2.97	0.76
	6	7415	0.3559	-0.0380	0.0351	9.5563	353 47.4	7.42	+ 0.79	0.73
	11	7420	0.3145	+0.1081	-0.0190	9.5225	18 52.1	8.29	- 2.85	+0.50
April	16	7425	0.2120	0.2318	+0.0006	9.4964	47 45.2	6.69	7.31	-0.02
	21	7430	+0.0608	0.3008	0.0200	9.4880	79 6.9	-2.02	10.06	0.67
	26	7435	-0.1057	0.2960	0.0346	9.5012	110 7.3	+3.22	9.03	1.05
	31	7440	0.2491	0.2243	0.0413	9.5299	138 11.1	6.23	5.61	1.03
	5	7445	0.3468	+0.1097	0.0403	9.5643	162 22.6	6.85	- 2.16	0.79
May	10	7450	0.3031	-0.0220	0.0333	9.5969	183 4.0	6.20	+ 0.35	0.52
	15	7455	0.3925	0.1515	0.0223	9.6244	201 3.7	5.12	1.98	0.29
	20	7460	0.3531	0.2665	+0.0091	9.6455	217 8.8	3.97	3.00	-0.10
	25	7465	0.2833	0.3589	-0.0050	9.6598	231 58.1	2.89	3.66	+0.06
	30	7470	0.1917	0.4236	0.0187	9.6675	246 3.3	1.86	4.10	0.18
June	5	7475	-0.0857	0.4572	0.0310	9.6687	259 51.4	+0.83	4.39	0.29
	10	7480	+0.0261	0.4576	0.0411	9.6634	273 47.4	-0.25	4.56	0.41
	15	7485	0.1361	0.4235	0.0479	9.6515	288 17.3	1.47	4.57	0.52
	20	7490	0.2348	0.3547	0.0510	9.6328	303 50.7	2.89	4.36	0.63
	25	7495	0.3113	0.2529	0.0493	9.6076	321 3.6	4.56	3.70	0.72
July	30	7500	0.3531	-0.1235	0.0420	9.5766	340 40.2	6.40	+ 2.24	0.76
	4	7505	0.3464	+0.0221	0.0292	9.5432	3 30.3	7.96	- 0.51	0.67
	9	7510	0.2803	0.1628	-0.0113	9.5104	30 10.6	8.02	4.66	+0.32
	14	7515	+0.1550	0.2680	+0.0088	9.4904	60 20.0	-5.10	8.81	-0.29
	19	7520	-0.0074	0.3081	0.0267	9.4909	91 55.6	+0.24	10.10	0.87
Aug.	24	7525	0.1685	0.2738	0.0382	9.5116	121 58.0	4.79	7.78	1.09
	29	7530	0.2949	0.1813	0.0418	9.5437	148 28.5	6.71	4.13	0.95
	4	7535	0.3716	+0.0571	0.0381	9.5780	171 9.6	6.67	- 1.03	0.68
	9	7540	0.3980	-0.0757	0.0293	9.6088	190 39.2	5.78	+ 1.10	0.43
	14	7545	0.3807	0.2005	0.0172	9.6338	207 47.1	4.65	2.45	0.21
Sept.	19	7550	0.3280	0.3071	+0.0034	9.6521	223 17.2	3.52	3.30	-0.03
	24	7555	0.2485	0.3886	-0.0106	9.6637	237 45.1	2.47	3.86	+0.10
	29	7560	0.1499	0.4412	0.0239	9.6688	251 40.3	1.44	4.23	0.23
	3	7565	-0.0406	0.4615	0.0354	9.6673	265 28.6	+0.40	4.47	0.34
	8	7570	+0.0716	0.4480	0.0443	9.6593	279 35.1	-0.73	4.59	0.45
Oct.	13	7575	0.1782	0.3997	0.0498	9.6447	294 26.9	2.02	4.52	0.56
	18	7580	0.2694	0.3170	0.0509	9.6234	310 35.9	3.53	4.17	0.67
	23	7585	0.3331	0.2030	0.0470	9.5957	328 41.4	5.29	3.24	0.74
	28	7590	0.3569	-0.0654	0.0375	9.5628	349 30.6	7.12	+ 1.31	0.75
	2	7595	0.3271	+0.0814	0.0224	9.5286	13 51.6	8.26	- 2.06	0.57
Nov.	7	7600	0.2358	0.2117	-0.0032	9.5003	42 4.6	7.25	6.50	+0.10
	12	7605	+0.0916	+0.2932	+0.0164	9.4879	73 9.5	-3.04	- 9.81	-0.55

NOTE.—The Epoch is the 2,405,000th day of the Julian Period = 1872, July 25.

# HELIOCENTRIC COÖRDINATES. 401

MERCURY.										
1879.	Julian Day.	<i>x</i> .	<i>y</i> .	<i>z</i> .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{p}x$ .	$-\frac{r^2}{p}y$ .	$-\frac{r^2}{p}z$ .	
Sept.	17	7610	-0.0751	+0.3027	+0.0323	9.4972	104° 27.8	+ 2.36	- 9.49	-1.01
	22	7615	0.2252	0.2418	0.0407	9.5238	133 12.3	5.88	6.32	1.06
	27	7620	0.3323	0.1333	0.0410	9.5578	158 7.2	6.87	2.75	0.84
Oct.	2	7625	0.3882	+0.0032	0.0350	9.5911	179 24.7	6.36	- 0.05	0.57
	7	7630	0.3958	-0.1280	0.0246	9.6197	197 51.0	5.34	+ 1.71	0.34
	12	7635	0.2632	0.2464	+0.0117	9.6420	214 14.4	4.19	2.84	-0.13
	17	7640	0.2984	0.3435	-0.0024	9.6576	229 15.3	3.08	3.56	+0.03
	22	7645	0.2101	0.4138	0.0162	9.6666	243 26.7	2.05	4.03	0.16
	27	7650	-0.1064	0.4535	0.0288	9.6690	257 16.1	+ 1.02	4.35	0.28
	Nov. 1	7655	+0.0050	0.4602	0.0394	9.6649	271 8.6	- 0.04	4.54	0.39
	6	7660	0.1160	0.4327	0.0470	9.6542	285 30.1	1.23	4.59	0.50
	11	7665	0.2176	0.3701	0.0507	9.6369	300 49.1	2.60	4.42	0.61
	16	7670	0.2992	0.2743	0.0500	9.6129	317 40.1	4.23	3.87	0.70
	21	7675	0.3485	0.1494	0.0438	9.5828	336 46.0	6.06	2.60	0.76
	26	7680	0.3519	-0.0060	0.0320	9.5488	358 56.1	7.73	+ 0.12	0.71
Dec.	1	7685	0.2974	+0.1381	-0.0150	9.5158	24 52.2	8.21	- 3.81	+0.41
	6	7690	0.1823	0.2525	+0.0050	9.4928	54 28.4	5.87	8.16	-0.16
	11	7695	+0.0243	0.3063	0.0238	9.4891	86 1.4	- 0.80	10.16	0.79
	16	7700	-0.1400	0.2854	0.0367	9.5065	116 33.5	+ 4.12	8.40	1.08
	21	7705	0.2748	0.2019	0.0417	9.5373	143 47.8	6.53	4.80	0.99
	26	7710	0.3612	+0.0822	0.0393	9.5717	167 9.9	6.78	- 1.54	0.74
	31	7715	0.3967	-0.0510	0.0313	9.6034	187 11.7	5.98	+ 0.76	0.47
	36	7720	-0.3868	-0.1782	+0.0196	9.6296	204 42.7	+ 4.86	+ 2.25	-0.25
	VENUS.									
	1879.	Julian Day.	<i>x</i> .	<i>y</i> .	<i>z</i> .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{p}x$ .	$-\frac{r^2}{p}y$ .	$-\frac{r^2}{p}z$ .
Jan.	0	7350	+0.3022	-0.6619	-0.0272	9.8622	294° 35.3	- 9.50	+20.82	+0.85
	5	7355	0.3903	0.6140	0.0315	9.8623	302 29.6	12.27	19.30	0.99
	10	7360	0.4710	0.5544	0.0353	9.8623	310 23.8	14.80	17.42	1.11
	15	7365	0.5426	0.4841	0.0384	9.8623	318 17.9	17.06	15.22	1.21
	20	7370	0.6039	0.4047	0.0407	9.8622	326 12.1	18.99	12.73	1.28
	25	7375	0.6536	0.3175	0.0422	9.8620	334 6.7	20.58	10.00	1.33
	30	7380	0.6908	0.2242	0.0430	9.8618	342 1.6	21.78	7.07	1.35
	Feb. 4	7385	0.7147	0.1266	0.0429	9.8616	349 56.9	22.57	4.00	1.35
	9	7390	0.7249	-0.0265	0.0420	9.8613	357 52.9	22.94	+ 0.84	1.33
	14	7395	0.7212	+0.0740	0.0403	9.8610	5 49.6	22.88	- 2.35	1.28
	19	7400	0.7035	0.1732	0.0378	9.8606	13 47.0	22.37	5.51	1.20
	24	7405	0.6722	0.2689	0.0346	9.8602	21 45.2	21.43	8.58	1.10
	March 1	7410	0.6279	0.3594	0.0307	9.8598	29 44.3	20.07	11.49	0.98
	6	7415	0.5714	0.4430	0.0262	9.8594	37 44.3	18.32	14.20	0.84
	11	7420	0.5037	0.5179	0.0212	9.8590	45 45.3	16.20	16.65	0.68
	16	7425	0.4262	0.5827	0.0158	9.8586	53 47.1	13.74	18.79	0.51
	21	7430	0.3403	0.6360	0.0101	9.8582	61 49.8	11.00	20.57	0.33
	26	7435	0.2477	0.6769	-0.0042	9.8578	69 53.4	8.03	21.95	+0.14
	31	7440	0.1503	0.7044	+0.0018	9.8575	77 57.8	4.88	22.89	-0.06
	April 5	7445	+0.0498	0.7180	0.0078	9.8572	86 2.9	- 1.62	23.38	0.25
	10	7450	-0.0516	0.7173	0.0136	9.8569	94 8.7	+ 1.68	23.40	0.44
	15	7455	0.1520	0.7024	0.0192	9.8567	102 15.0	4.97	22.95	0.62
	20	7460	-0.2494	+0.6735	+0.0243	9.8565	110 21.8	+ 8.16	-22.03	-0.79

NOTE.—The Epoch is the 2,405,000th day of the Julian Period = 1572, July 25.

# 402 HELIOCENTRIC COÖRDINATES.

VENUS.										
1879.	Julian Day.	<i>x</i> .	<i>y</i> .	<i>z</i> .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{p}x$ .	$-\frac{r^2}{p}y$ .	$-\frac{r^2}{p}z$ .	
April	25	240								
	30	7465	-0.3418	+0.0313	+0.0290	9.8564	118 28.8	+11.19	-20.66	-0.95
May	5	7470	0.4274	0.5765	0.0331	9.8563	126 36.1	14.00	18.87	1.09
	10	7475	0.5045	0.5101	0.0365	9.8564	134 43.4	16.52	16.70	1.20
	15	7480	0.5715	0.4336	0.0392	9.8564	142 50.6	18.71	14.19	1.28
	20	7485	0.6272	0.3486	0.0412	9.8565	150 57.5	20.51	11.40	1.34
	25	7490	0.6704	0.2565	0.0423	9.8567	159 4.2	21.89	8.38	1.38
	30	7495	0.7002	0.1594	0.0426	9.8570	167 10.4	22.83	5.20	1.39
	5	7500	0.7162	+0.0591	0.0420	9.8572	175 16.1	23.31	- 1.92	1.37
	10	7505	0.7180	-0.0424	0.0406	9.8576	183 21.0	23.32	+ 1.38	1.32
June	15	7510	0.7056	0.1430	0.0384	9.8579	191 25.2	22.86	4.63	1.24
	20	7515	0.6793	0.2409	0.0354	9.8583	199 28.5	21.95	7.78	1.14
	25	7520	0.6396	0.3339	0.0318	9.8587	207 31.0	20.61	10.75	1.02
	30	7525	0.5875	0.4205	0.0275	9.8591	215 32.6	18.87	13.51	0.88
	5	7530	0.5238	0.4988	0.0227	9.8595	223 33.3	16.78	15.98	0.72
	10	7535	0.4499	0.5674	0.0174	9.8599	231 33.1	14.37	18.13	0.56
	15	7540	0.3673	0.6250	0.0118	9.8603	239 31.9	11.70	19.91	0.38
	20	7545	0.2775	0.6704	+0.0060	9.8607	247 29.9	8.82	21.30	-0.19
	25	7550	0.1824	0.7029	0.0000	9.8611	255 27.1	5.78	22.28	0.00
	30	7555	-0.0638	0.7219	-0.0059	9.8614	263 23.6	+ 2.65	22.83	+0.19
	5	7560	+0.0165	0.7269	0.0117	9.8617	271 19.4	- 0.52	22.94	0.37
	10	7565	0.1164	0.7180	0.0173	9.8619	279 14.7	3.67	22.63	0.55
Aug.	15	7570	0.2141	0.6954	0.0226	9.8621	287 9.5	6.74	21.89	0.71
	20	7575	0.3077	0.6594	0.0274	9.8622	295 3.9	9.68	20.74	0.86
	25	7580	0.3954	0.6107	0.0318	9.8623	302 58.1	12.43	19.20	1.00
	30	7585	0.4755	0.5504	0.0355	9.8623	310 52.2	14.94	17.30	1.12
	5	7590	0.5466	0.4796	0.0385	9.8623	318 46.4	17.18	15.08	1.21
	10	7595	0.6072	0.3996	0.0408	9.8622	326 40.7	19.10	12.57	1.28
	15	7600	0.6562	0.3120	0.0423	9.8620	334 35.3	20.66	9.82	1.33
	20	7605	0.6926	0.2184	0.0430	9.8618	342 30.2	21.84	6.89	1.36
Sept.	25	7610	0.7158	0.1206	0.0429	9.8616	350 25.6	22.61	3.81	1.36
	30	7615	0.7251	-0.0205	0.0419	9.8613	358 21.6	22.95	+ 0.65	1.33
	5	7620	0.7205	+0.0800	0.0402	9.8610	6 18.2	22.86	- 2.54	1.27
	10	7625	0.7020	0.1791	0.0376	9.8606	14 15.7	22.33	5.69	1.20
	15	7630	0.6699	0.2746	0.0344	9.8602	22 14.0	21.36	8.75	1.10
	20	7635	0.6249	0.3647	0.0305	9.8598	30 13.1	19.07	11.66	0.97
	25	7640	0.5676	0.4477	0.0259	9.8594	38 13.1	18.19	14.35	0.83
	30	7645	0.4993	0.5221	0.0209	9.8590	46 14.1	16.05	16.79	0.67
Nov.	5	7650	0.4213	0.5862	0.0155	9.8587	54 16.0	13.58	18.91	0.50
	10	7655	0.3350	0.6389	0.0098	9.8582	62 18.7	10.83	20.65	0.31
	15	7660	0.2420	0.6789	-0.0038	9.8578	70 22.3	7.85	22.01	+0.12
	20	7665	0.1443	0.7056	+0.0022	9.8575	78 26.7	4.70	22.93	-0.07
	25	7670	+0.0438	0.7183	0.0081	9.8572	86 31.9	- 1.43	23.39	0.27
	30	7675	-0.0576	0.7168	0.0139	9.8569	94 37.6	+ 1.88	23.38	0.46
	5	7680	0.1579	0.7011	0.0195	9.8567	102 43.9	5.16	22.90	0.64
	10	7685	0.2550	0.6715	0.0246	9.8565	110 50.6	8.34	21.96	0.80
Dec.	15	7690	0.3470	0.6284	0.0292	9.8564	118 57.6	11.36	20.57	0.96
	20	7695	0.4322	0.5728	0.0333	9.8564	127 4.8	14.15	18.76	1.09
	25	7700	0.5087	0.5060	0.0367	9.8564	135 12.0	16.65	16.57	1.20
	30	7705	0.5751	0.4289	0.0394	9.8564	143 19.2	18.82	14.04	1.29
	5	7710	0.6301	0.3434	0.0413	9.8566	151 26.1	20.61	11.23	1.35
	10	7715	0.6725	0.2510	0.0424	9.8568	159 32.7	21.97	8.20	1.38
	15	7720	-0.7015	+0.1536	+0.0426	9.8570	167 38.9	+22.88	- 5.01	-1.39

NOTE.—The Epoch is the 2,405,000th day of the Julian Period = 1872, July 25.

# HELIOCENTRIC COÖRDINATES. 403

## THE EARTH.

1879.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{p}x$ .	$-\frac{r^2}{p}y$ .	$-\frac{r^2}{p}z$ .
Jan.	0	240							
	7350	-0.1686	+0.9687	0.0000	9.9927	99° 52.2	+ 2.36	-13.59	0.00
	10	7360	0.3374	0.9230	9.9928	110 3.6	4.73	12.95	
	20	7370	0.4957	0.8499	9.9931	120 14.6	6.93	11.90	
	30	7380	0.6387	0.7503	9.9936	130 24.4	8.91	10.46	
Feb.	9	7390	0.7621	0.6272	9.9943	140 32.4	10.58	8.70	
	19	7400	0.8620	0.4850	9.9952	150 38.2	11.89	6.68	
March	1	7410	0.9355	0.3278	9.9962	160 41.3	12.81	4.49	
	11	7420	0.9809	+0.1608	9.9974	170 41.3	13.32	- 2.19	
	21	7430	0.9966	-0.0111	9.9986	180 38.2	13.42	+ 0.15	
	31	7440	0.9827	0.1826	9.9998	190 31.7	13.13	2.44	
April	10	7450	0.9399	0.3488	0.0011	200 21.8	12.45	4.62	
	20	7460	0.8694	0.5048	0.0023	210 8.6	11.42	6.63	
	30	7470	0.7736	0.6461	0.0034	219 52.1	10.08	8.42	
May	10	7480	0.6556	0.7687	0.0044	229 32.6	8.49	9.95	
	20	7490	0.5187	0.8694	0.0053	239 10.6	6.67	11.18	
	30	7500	0.3672	0.9454	0.0061	248 46.4	4.70	12.09	
June	9	7510	0.2052	0.9943	0.0066	258 20.6	2.62	12.67	
	19	7520	-0.0374	1.0151	0.0070	267 53.6	+ 0.48	12.91	
	29	7530	+0.1315	1.0079	0.0072	277 25.8	- 1.67	12.80	
July	9	7540	0.2966	0.9725	0.0072	286 57.8	3.77	12.35	
	19	7550	0.4535	0.9095	0.0070	296 30.1	5.77	11.57	
	29	7560	0.5975	0.8208	0.0065	306 3.3	7.62	10.47	
Aug.	8	7570	0.7246	0.7089	0.0059	315 37.8	9.28	9.08	
	18	7580	0.8312	0.5769	0.0051	325 14.3	10.71	7.43	
	28	7590	0.9143	0.4286	0.0042	334 53.1	11.85	5.55	
Sept.	7	7600	0.9710	0.2680	0.0031	344 34.4	12.68	3.49	
	17	7610	0.9998	-0.0995	0.0020	354 18.9	13.16	+ 1.31	
	27	7620	0.9993	+0.0718	0.0007	4 6.6	13.26	- 0.95	
Oct.	7	7630	0.9694	0.2409	9.9995	13 57.4	12.98	3.23	
	17	7640	0.9108	0.4029	9.9982	23 51.9	12.30	5.44	
	27	7650	0.8250	0.5529	9.9970	33 49.7	11.24	7.53	
Nov.	6	7660	0.7145	0.6863	9.9959	43 50.6	9.81	9.42	
	16	7670	0.5824	0.7988	9.9950	53 54.4	8.04	11.04	
	26	7680	0.4324	0.8868	9.9941	64 0.8	6.01	12.32	
Dec.	6	7690	0.2689	0.9476	9.9934	74 9.3	3.76	13.23	
	16	7700	+0.0973	0.9793	9.9930	84 19.5	- 1.36	13.72	
	26	7710	-0.0774	0.9804	9.9927	94 30.8	+ 1.09	13.76	
	36	7720	-0.2496	+0.9510	9.9927	104 42.2	+ 3.50	-13.35	0.00

## MARS.

1879.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{p}x$ .	$-\frac{r^2}{p}y$ .	$-\frac{r^2}{p}z$ .
Jan.	0	240							
	7350	-1.1249	-1.0808	+0.0041	0.19313	223° 51' 15"	+0.52	+0.50	0.00
	10	7360	1.0179	1.1657	-0.0003	0.18965	0.49	0.56	0.00
	20	7370	0.9028	1.2412	0.0047	0.18605	0.44	0.61	0.00
	30	7380	0.7804	1.3066	0.0091	0.18237	0.29	0.65	0.00
Feb.	9	7390	0.6514	1.3609	0.0134	0.17863	0.33	0.70	+0.01
	19	7400	0.5167	1.4036	0.0175	0.17486	0.27	0.74	0.01
March	1	7410	0.3775	1.4338	0.0214	0.17110	0.20	0.78	0.01
	11	7420	0.2349	1.4511	0.0254	0.16738	0.13	0.81	0.01
	21	7430	-0.0902	1.4549	0.0290	0.16373	+0.05	0.83	0.02
	31	7440	+0.0555	-1.4448	-0.0323	0.16021	-0.03	+0.84	+0.02

NOTE.—The Epoch is the 2,405,000th day of the Julian Period = 1872, July 23.

# 404 HELIOCENTRIC COÖRDINATES.

MARS.										
1879.	Julian Day.	<i>x</i> .	<i>y</i> .	<i>z</i> .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^2} z$ .	$-\frac{y^2}{r^2} y$ .	$-\frac{z^2}{r^2} z$ .	
April	10	240 7450	+0.2005	-1.4205	-0.0353	0.15685	278° 3' 6"	-0.12	+0.85	+0.02
	20	7460	0.3436	1.3620	0.0379	0.15369	283 58 39	0.21	0.84	0.02
	30	7470	0.4832	1.3294	0.0402	0.15078	289 59 14	0.30	0.83	0.03
May	10	7480	0.6177	1.2630	0.0420	0.14815	296 4 26	0.39	0.80	0.03
	20	7490	0.7456	1.1831	0.0434	0.14586	302 13 48	0.47	0.76	0.03
June	30	7500	0.8655	1.0904	0.0443	0.14392	308 26 48	0.63	0.71	0.03
	9	7510	0.9760	0.9859	0.0447	0.14238	314 42 48	0.68	0.65	0.03
	19	7520	1.0756	0.8705	0.0447	0.14126	321 1 6	0.72	0.58	0.03
July	29	7530	1.1633	0.7453	0.0442	0.14058	327 20 59	0.78	0.50	0.03
	9	7540	1.2380	0.6117	0.0431	0.14035	333 41 40	0.83	0.41	0.03
Aug.	19	7550	1.2987	0.4714	0.0416	0.14057	340 2 21	0.87	0.31	0.03
	29	7560	1.3449	0.3258	0.0396	0.14125	346 22 15	0.90	0.22	0.03
	8	7570	1.3762	0.1765	0.0371	0.14236	352 40 35	0.91	0.12	0.02
	18	7580	1.3922	-0.0253	0.0343	0.14390	358 56 37	0.91	+0.02	0.02
Sept.	28	7590	1.3930	+0.1262	0.0310	0.14582	5 9 40	0.90	-0.06	0.02
	7	7600	1.3788	0.2763	0.0275	0.14812	11 19 5	0.87	0.17	0.02
Oct.	17	7610	1.3500	0.4235	0.0236	1.15074	17 24 21	0.84	0.26	0.01
	27	7620	1.3070	0.5663	0.0195	0.15364	23 25 0	0.80	0.35	0.01
	7	7630	1.2506	0.7033	0.0152	0.15680	29 20 38	0.75	0.42	0.01
Nov.	17	7640	1.1817	0.8333	0.0108	0.16016	35 10 59	0.69	0.49	+0.01
	27	7650	1.1013	0.9551	0.0062	0.16368	40 55 48	0.63	0.54	0.00
	6	7660	1.0104	1.0678	-0.0016	0.16732	46 34 59	0.56	0.59	0.00
	16	7670	0.9100	1.1706	+0.0030	0.17104	52 8 27	0.49	0.63	0.00
Dec.	26	7680	0.8013	1.2627	0.0076	0.17480	57 36 13	0.42	0.67	0.00
	6	7690	0.6856	1.3437	0.0122	0.17857	62 58 20	0.35	0.69	-0.01
	16	7700	0.5641	1.4131	0.0166	0.18231	68 14 56	0.28	0.71	0.01
	26	7710	0.4377	1.4707	0.0209	0.18599	73 26 11	0.21	0.72	0.01
	36	7720	+0.3078	+1.5162	+0.0250	0.18959	78 32 14	-0.15	-0.72	-0.01
JUPITER.										
1879.	Julian Day.	<i>x</i> .	<i>y</i> .	<i>z</i> .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^2} z$ .	$-\frac{y^2}{r^2} y$ .	$-\frac{z^2}{r^2} z$ .	
Jan.	0	240 7350	+3.63773	-3.51202	-0.06948	0.70388	316° 0' 52"	-127.10	+122.71	+2.43
	10	7360	3.68890	3.45366	0.07084	0.70362	316 53 37	129.13	120.89	2.48
	20	7370	3.73922	3.39452	0.07220	0.70335	317 46 26	131.13	119.04	2.53
	30	7380	3.78668	3.33459	0.07353	0.70309	318 39 18	133.10	117.15	2.58
Feb.	9	7390	3.83726	3.27390	0.07485	0.70283	319 32 13	135.05	115.22	2.63
	19	7400	3.88496	3.21246	0.07615	0.70258	320 25 12	136.97	113.26	2.69
Mar.	1	7410	3.93176	3.15028	0.07744	0.70232	321 18 16	138.86	111.26	2.74
	11	7420	3.97765	3.08737	0.07870	0.70207	322 11 23	140.73	109.23	2.79
April	21	7430	4.02262	3.02376	0.07994	0.70183	323 4 33	142.56	107.16	2.84
	31	7440	4.06667	2.95944	0.08117	0.70158	323 57 47	144.36	105.06	2.89
	10	7450	4.10977	2.89443	0.08238	0.70134	324 51 4	146.14	102.92	2.93
May	20	7460	4.15191	2.82875	0.08357	0.70111	325 42 25	147.88	100.75	2.98
	30	7470	4.19308	2.76240	0.08474	0.70087	326 37 50	149.58	98.55	3.03
	10	7480	4.23327	2.69540	0.08589	0.70064	327 31 19	151.26	96.31	3.07
	20	7490	4.27247	2.62777	0.08702	0.70041	328 24 50	152.90	94.04	3.12
	30	7500	+4.31067	-2.55952	-0.08813	0.70019	329 18 26	-154.51	+ 91.74	+3.16

NOTE.—The Epoch is the 2,405,000th day of the Julian Period = 1872, July 25.

# HELIOCENTRIC COÖRDINATES. 405

JUPITER.										
1870.	Julian Day.	<i>x</i> .	<i>y</i> .	<i>z</i> .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{p}x$ .	$-\frac{r^2}{p}y$ .	$-\frac{r^2}{p}z$ .	
June	9	240 7510	+4.34786	-2.49066	-0.08922	0.69997	330° 12' 4"	-156.08	+89.41	+3.20
	19	7520	4.38402	2.42121	0.09029	0.69975	331 5 46	157.61	87.05	3.25
	29	7530	4.41914	2.35119	0.09133	0.69954	331 59 32	159.11	84.65	3.29
July	9	7540	4.45323	2.28063	0.09236	0.69933	332 53 20	160.57	82.23	3.33
	19	7550	4.48627	2.20953	0.09336	0.69912	333 47 11	161.99	79.78	3.37
Aug.	29	7560	4.51826	2.13790	0.09435	0.69892	334 41 6	163.37	77.30	3.41
	8	7570	4.54918	2.06577	0.09531	0.69872	335 35 3	164.71	74.80	3.45
	18	7580	4.57901	1.99316	0.09624	0.69853	336 29 3	166.02	72.26	3.49
Sept.	28	7590	4.60775	1.92007	0.09716	0.69834	337 23 6	167.28	69.71	3.53
	7	7600	4.63538	1.84653	0.09805	0.69815	338 17 12	168.50	67.12	3.56
	17	7610	4.66190	1.77254	0.09892	0.69797	339 11 20	169.68	64.51	3.60
	27	7620	4.68731	1.69813	0.09976	0.69779	340 5 31	170.81	61.88	3.64
Oct.	7	7630	4.71159	1.62332	0.10058	0.69761	340 59 44	171.91	59.23	3.67
	17	7640	4.73475	1.54811	0.10137	0.69744	341 54 0	172.96	56.55	3.70
	27	7650	4.75679	1.47254	0.10214	0.69728	342 48 19	173.96	53.85	3.74
Nov.	6	7660	4.77769	1.39660	0.10289	0.69712	343 42 41	174.92	51.13	3.77
	16	7670	4.79744	1.32033	0.10361	0.69696	344 37 5	175.84	48.39	3.80
	26	7680	4.81603	1.24374	0.10431	0.69680	345 31 31	176.71	45.63	3.83
Dec.	6	7690	4.83347	1.16684	0.10498	0.69666	346 26 0	177.53	42.86	3.86
	16	7700	4.84975	1.08967	0.10563	0.69651	347 20 31	178.30	40.06	3.88
	26	7710	4.86487	1.01223	0.10625	0.69637	348 15 4	179.03	37.25	3.91
	36	7720	+4.87881	-0.93455	-0.10685	0.69624	349 9 40	-179.70	+ 34.42	+3.94
SATURN.										
1870.	Julian Day.	<i>x</i> .	<i>y</i> .	<i>z</i> .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{p}x$ .	$-\frac{r^2}{p}y$ .	$-\frac{r^2}{p}z$ .	
Jan.	0	240 7350	+9.48985	+0.45793	-0.36819	0.97813	2° 46' 48"	-14.92	-0.72	+0.61
	10	7360	9.48399	0.51365	0.36868	0.97799	3 7 2	14.93	0.81	0.61
	20	7370	9.47781	0.56935	0.36956	0.97785	3 27 16	14.93	0.90	0.61
	30	7380	9.47129	0.62503	0.39022	0.97772	3 47 31	14.94	0.99	0.62
Feb.	9	7390	9.46445	0.68069	0.39087	0.97758	4 7 47	14.94	1.07	0.62
	19	7400	9.45728	0.73632	0.39151	0.97745	4 28 4	14.94	1.16	0.62
March	1	7410	9.44978	0.79193	0.39213	0.97731	4 48 22	14.94	1.25	0.62
	11	7420	9.44195	0.84751	0.39274	0.97718	5 8 40	14.95	1.34	0.62
April	21	7430	9.43379	0.90306	0.39334	0.97704	5 28 59	14.95	1.43	0.62
	31	7440	9.42530	0.95858	0.39392	0.97691	5 49 19	14.95	1.52	0.62
	10	7450	9.41649	1.01407	0.39449	0.97677	6 9 40	14.95	1.61	0.63
	20	7460	9.40735	1.06952	0.39505	0.97664	6 30 1	14.95	1.70	0.63
May	30	7470	9.39788	1.12493	0.39559	0.97650	6 50 23	14.95	1.79	0.63
	10	7480	9.38808	1.18030	0.39612	0.97637	7 10 46	14.95	1.88	0.63
	20	7490	9.37795	1.23563	0.39663	0.97623	7 31 10	14.94	1.97	0.63
	30	7500	9.36749	1.29091	0.39713	0.97610	7 51 34	14.94	2.06	0.63
June	9	7510	9.35670	1.34615	0.39762	0.97596	8 12 0	14.94	2.15	0.63
	19	7520	9.34558	1.40134	0.39809	0.97582	8 32 26	14.93	2.24	0.64
July	29	7530	9.33414	1.45649	0.39855	0.97569	8 52 52	14.93	2.33	0.64
	9	7540	9.32236	1.51159	0.39899	0.97555	9 13 20	14.92	2.42	0.64
	19	7550	9.31026	1.56663	0.39942	0.97541	9 33 48	14.92	2.51	0.64
	29	7560	+9.29783	+1.62161	-0.39984	0.97528	9 54 17	-14.91	-2.60	+0.64

NOTE.—The Epoch is the 2,405,000th day of the Julian Period = 1872, July 25.



# 406 HELIOCENTRIC COÖRDINATES.

SATURN.									
1879.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^2} z$ .	$-\frac{y^2}{r^2} y$ .	$-\frac{z^2}{r^2} z$ .
	240								
Aug. 8	7570	+9.28507	+1.67654	-0.40024	0.97514	10 14 47	-14.91	-2.69	+0.64
18	7580	9.27198	1.73141	0.40063	0.97501	10 35 18	14.90	2.78	0.64
28	7590	9.25856	1.78622	0.40100	0.97487	10 55 49	14.89	2.87	0.64
Sept. 7	7600	9.24481	1.84096	0.40136	0.97474	11 16 21	14.88	2.96	0.65
17	7610	9.23074	1.89564	0.40171	0.97460	11 36 54	14.87	3.05	0.65
27	7620	9.21634	1.95025	0.40204	0.97447	11 57 28	14.86	3.15	0.65
Oct. 7	7630	9.20161	2.00480	0.40236	0.97433	12 18 2	14.85	3.24	0.65
17	7640	9.18656	2.05927	0.40266	0.97420	12 38 37	14.84	3.33	0.65
27	7650	9.17118	2.11367	0.40295	0.97406	12 59 13	14.83	3.42	0.65
Nov. 6	7660	9.15547	2.16799	0.40322	0.97393	13 19 50	14.82	3.51	0.65
16	7670	9.13944	2.22223	0.40348	0.97379	13 40 27	14.81	3.60	0.65
26	7680	9.12308	2.27640	0.40372	0.97366	14 1 6	14.80	3.69	0.65
Dec. 6	7690	9.10639	2.33048	0.40395	0.97352	14 21 45	14.78	3.78	0.66
16	7700	9.08938	2.38448	0.40417	0.97339	14 42 24	14.77	3.87	0.66
26	7710	9.07204	2.43839	0.40437	0.97325	15 3 5	14.76	3.97	0.66
36	7720	+9.05438	+2.49221	-0.40456	0.97312	15 23 46	-14.74	-4.06	+0.66
URANUS.									
1879.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^2} z$ .	$-\frac{y^2}{r^2} y$ .	$-\frac{z^2}{r^2} z$ .
	240								
Jan. 10	7360	-16.10130	+8.72061	+0.24165	+1.26276	151 33 38	+0.50	-0.27	-0.01
Feb. 19	7400	16.17688	8.57488	0.24205	1.26270	152 4 27	0.50	0.26	0.01
Mar. 31	7440	16.25122	8.42851	0.24244	1.26265	152 35 17	0.50	0.26	0.01
May 10	7480	16.32433	8.28150	0.24281	1.26261	153 6 6	0.51	0.26	0.01
June 19	7520	16.39619	8.13387	0.24316	1.26256	153 36 56	0.51	0.25	0.01
July 29	7560	16.46678	7.98562	0.24350	1.26251	154 7 47	0.51	0.25	0.01
Sept. 7	7600	16.53613	7.83675	0.24382	1.26247	154 38 38	0.51	0.24	0.01
Oct. 17	7640	16.60424	7.68728	0.24412	1.26243	155 9 29	0.51	0.24	0.01
Nov. 26	7680	16.67109	7.53723	0.24440	1.26239	155 40 20	0.52	0.23	0.01
Dec. 36	7720	-16.73667	+7.38661	+0.24466	+1.26235	156 11 12	+0.52	-0.23	-0.01
NEPTUNE.									
1879.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^2} z$ .	$-\frac{y^2}{r^2} y$ .	$-\frac{z^2}{r^2} z$ .
	240								
Jan. 10	7320	+23.3274	+18.5495	-0.9268	1.47448	38 29 31	-0.22	-0.18	+0.01
10	7360	23.2484	18.6486	0.9269	1.47448	38 44 8	0.22	0.18	0.01
Feb. 19	7400	23.1690	18.7474	0.9270	1.47448	38 58 45	0.22	0.18	0.01
Mar. 31	7440	23.0892	18.8459	0.9271	1.47449	39 13 22	0.22	0.18	0.01
May 10	7480	23.0090	18.9441	0.9272	1.47449	39 27 59	0.22	0.18	0.01
June 19	7520	22.9283	19.0420	0.9272	1.47449	39 42 36	0.22	0.18	0.01
July 29	7560	22.8472	19.1395	0.9273	1.47449	39 57 13	0.22	0.18	0.01
Sept. 7	7600	22.7657	19.2367	0.9273	1.47450	40 11 50	0.22	0.18	0.01
Oct. 17	7640	22.6838	19.3335	0.9273	1.47450	40 26 28	0.22	0.18	0.01
Nov. 26	7680	22.6014	19.4300	0.9273	1.47450	40 41 5	0.21	0.18	0.01
Dec. 36	7720	+22.5186	+19.5261	-0.9272	1.47450	40 55 43	-0.21	-0.19	+0.01

NOTE. The Epoch is the 2,405,000th day of the Julian Period = 1872, July 25.

## INCLINATIONS AND NODES.

Planet.	Inclination.	Increase in 100 Days.		Longitude of Ascending Node.	Increase in 100 Days.	
	$i$	$\Delta i$	$\Delta' i$	$\Omega$	$\Delta \Omega$	$\Delta' \Omega$
Mercury . .	$7^{\circ} 0' 9.8''$	+0.01947	-0.05777	$46^{\circ} 49' 3.1''$	+11.644	-1.271
Venus . . .	3 23 35.9	+0.01514	-0.00772	75 32 6.8	8.904	-2.705
Mars . . .	1 51 1.8	-0.00586	-0.07991	48 34 1.9	7.585	-2.905
Jupiter . .	1 18 35.4	-0.06189	-0.02747	99 7 15.4	9.397	+1.075
Saturn . . .	2 29 19.9	-0.03825	+0.02400	112 30 53.2	8.398	-2.760
Uranus . . .	0 46 21.1	+0.00688	-0.01613	73 21 7.0	5.080	+0.885
Neptune . .	1 46 54.7	-0.09020	+0.00364	130 22 29.7	+10.885	-0.031

NOTE.—The Epoch is the 2405,000th day of the Julian Period = 1873, July 25.

$\Delta i$  and  $\Delta \Omega$  refer to the moving ecliptic and equinox.

$\Delta' i$  and  $\Delta' \Omega$  refer to the ecliptic and equinox of the epoch.

## MASSES. SUN'S=1.

Planet.	Mass.	Log. of Mass.	Authority.
Mercury . .	$\frac{1}{4865751} = .000\ 000\ 206$	93.31285	ENCKE, <i>A. N.</i> , No. 443.
Venus . . .	$\frac{1}{390000} = .000\ 002\ 564$	94.40893	LE VERRIER, <i>Théor. de Merc.</i> , p. 115.
The Earth .	$\frac{1}{354936} = .000\ 002\ 817$	94.44985	LE VERRIER, <i>Théor. de Merc.</i> , p. 26.
Mars . . .	$\frac{1}{2680637} = .000\ 000\ 373$	93.57176	BURCKHARDT, <i>Conn. des Temps.</i> , 1816, p. 343.
Jupiter . .	$\frac{1}{1047.879 \pm 235} = .000\ 954\ 308$	96.979689	BESSEL, <i>Die Masse des Jupiter</i> , p. 64.
Saturn . . .	$\frac{1}{3501.6} = .000\ 285\ 584$	96.455733	BESSEL, <i>Comptes Rendus</i> , 1841.
Uranus . . .	$\frac{1}{24905} = .000\ 040\ 153$	95.60371	LAHONT, <i>Mem. Ast. Soc.</i> , Vol. XI. p. 54.
Neptune . .	$\frac{1}{18780} = .000\ 053\ 248$	95.72630	PEIRCE, <i>Am. Ac. Proc.</i> , Vol. I. p. 333.
Uranus . . .	$\frac{1}{22600 \pm 100}$ . . . . .	. . . . .	NEWCOMB, Uranian and Neptunian systems, p. 36.
Neptune . .	$\frac{1}{19380 \pm 80}$ . . . . .	. . . . .	NEWCOMB, Uranian and Neptunian systems, p. 63.

## ECLIPSES IN 1879.

In the year 1879 there will be three Eclipses, two of the Sun and one of the Moon.

I. An Annular Eclipse of the Sun, January 21, 1879, invisible at Washington, with the following elements:

Washington mean time of $\delta$ in Right Ascension, January 21 <sup>d</sup> 18 <sup>h</sup> 38 <sup>m</sup> 3.5 <sup>s</sup> .			
Sun and Moon's R. A.	20 <sup>h</sup> 17 <sup>m</sup> 37.41 <sup>s</sup>	Hourly Motions,	10.53 and 133.13
Sun's Declination,	-19° 41' 50".4	Hourly Motion,	+ 0' 34".3
Moon's Declination,	-19 52 46.4	" "	+10 20.3
Sun's Equa. Hor. Par.	9.0	True Semidiameter,	16 15.1
Moon's Equa Hor. Par.	56 56.8	" "	15 28.2

From these elements may be deduced the following results:—

Eclipse begins on the Earth January 21<sup>d</sup> 15<sup>h</sup> 51<sup>m</sup>.7, Washington mean time, in longitude 25° 52'.5 East from Washington, and in latitude 23° 55'.8 South.

Central Eclipse begins on the Earth 16<sup>h</sup> 55<sup>m</sup>.0, in longitude 8° 28'.4 East from Washington, and in latitude 27° 28'.3 South.

Central Eclipse at Noon 18<sup>h</sup> 38<sup>m</sup>.1, in longitude 83° 26'.2 East from Washington, and in latitude 30° 53'.5 South.

Central Eclipse ends on the Earth 20<sup>h</sup> 35<sup>m</sup>.2, in longitude 141° 20'.5 East from Washington, and in latitude 7° 48'.8 North.

Eclipse ends on the Earth 21<sup>h</sup> 38<sup>m</sup>.4, in longitude 124° 13'.1 East from Washington, and in latitude 11° 23'.8 North.

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
<sup>h</sup> <sup>m</sup>				9.97	9.97	-9.53	-9.52	
15 50	-1.42193	-0.11415	-1.23156	3006	4485	3943	2430	234° 33' 10.1
16 0	1.33731	0.08561	1.20307	3010	4489	3912	2398	237 3 9.2
16 10	1.25270	0.05706	1.17457	3014	4493	3880	2365	239 33 8.3
16 20	1.16808	-0.02850	1.14607	3018	4497	3849	2333	242 3 7.4
16 30	1.08346	+0.00007	1.11756	3022	4501	3817	2300	244 33 6.5
16 40	0.99884	0.02865	1.08904	3027	4505	3785	2268	247 3 5.7
16 50	0.91422	0.05724	1.06051	3031	4509	3754	2235	249 33 4.8
17 0	0.82960	0.08583	1.03197	3035	4514	3722	2202	252 3 3.9
17 10	0.74499	0.11443	1.00342	3039	4518	3691	2170	254 33 3.0
17 20	0.66038	0.14304	0.97486	3043	4522	3659	2137	257 3 2.1
17 30	0.57577	0.17166	0.94630	3047	4526	3628	2105	259 33 1.3
17 40	0.49116	0.20028	0.91773	3052	4530	3596	2072	262 3 0.4
17 50	0.40656	0.22891	0.88915	3056	4534	3564	2040	264 32 59.5
18 0	0.32195	0.25755	0.86055	3060	4538	3533	2007	267 2 58.6
18 10	0.23735	0.28620	0.83195	3064	4542	3501	1974	269 32 57.7
18 20	0.15275	0.31486	0.80334	3068	4546	3469	1942	272 2 56.9
18 30	-0.06816	0.34352	0.77473	3072	4550	3438	1909	274 32 56.0
18 40	+0.01643	0.37218	0.74610	3077	4554	3406	1877	277 2 55.1
18 50	0.10102	0.40085	0.71747	3081	4558	3374	1844	279 32 54.3
19 0	0.18560	0.42953	0.68883	3085	4562	3343	1811	282 2 53.4
19 10	0.27018	0.45821	0.66018	3089	4566	3311	1779	284 32 52.5
19 20	0.35475	0.48690	0.63152	3093	4570	3279	1746	287 2 51.7
19 30	0.43932	0.51560	0.60286	3098	4574	3248	1713	289 32 50.8
19 40	0.52388	0.54430	0.57419	3102	4579	3216	1681	292 2 49.9
19 50	+0.60845	+0.57301	-0.54551	3106	4583	3184	1648	294 32 49.0

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
<sup>h</sup> <sup>m</sup>				9.97	9.97	-9.53	-9.52	
20 0	+0.69301	+0.60173	-0.51683	3110	4587	3152	1615	297° 2' 48.1
20 10	0.77756	0.63045	0.48814	3114	4591	3121	1583	299 32 47.3
20 20	0.86211	0.65918	0.45944	3118	4595	3089	1550	302 2 46.4
20 30	0.94665	0.68791	0.43072	3123	4599	3057	1517	304 32 45.5
20 40	1.03119	0.71665	0.40200	3127	4603	3025	1485	307 2 44.7
20 50	1.11572	0.74540	0.37328	3131	4607	2994	1452	309 32 43.8
21 0	1.20025	0.77415	0.34455	3135	4611	2962	1419	312 2 42.9
21 10	1.28477	0.80291	0.31581	3139	4615	2930	1386	314 32 42.0
21 20	1.36929	0.83167	0.28707	3144	4619	2898	1354	317 2 41.2
21 30	1.45380	0.86044	0.25832	3148	4623	2867	1321	319 32 40.3
21 40	+1.53830	+0.88921	-0.22956	3152	4627	2835	1288	322 2 39.4

## FOR SHADOW.

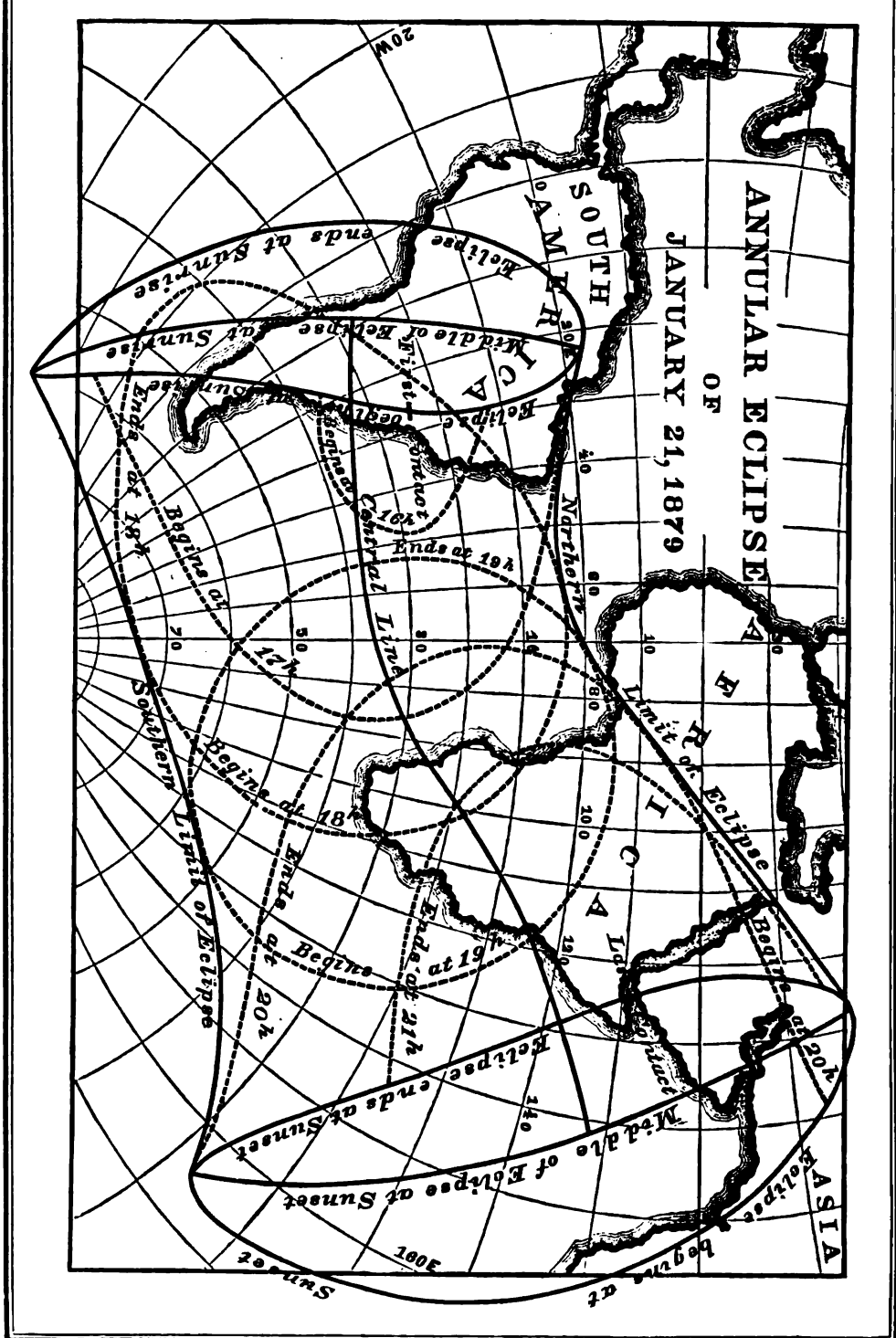
Washington Mean Time.	B.	C.	Washington Mean Time.	B.	C.
<sup>h</sup> <sup>m</sup>			<sup>h</sup> <sup>m</sup>		
16 50	-0.48875	-0.51452	18 50	-0.14514	-0.17148
17 0	0.46016	0.48598	19 0	0.11646	0.14284
17 10	0.43156	0.45743	19 10	0.08778	0.11419
17 20	0.40295	0.42887	19 20	0.05909	0.08553
17 30	0.37433	0.40031	19 30	0.03039	0.05687
17 40	0.34571	0.37174	19 40	-0.00169	-0.02820
17 50	0.31708	0.34316	19 50	+0.02702	+0.00048
18 0	0.28844	0.31456	20 0	0.05574	0.02916
18 10	0.25979	0.28596	20 10	0.08446	0.05785
18 20	0.23113	0.25735	20 20	0.11319	0.08655
18 30	0.20247	0.22874	20 30	0.14192	0.11527
18 40	-0.17381	-0.20011	29 40	+0.17066	+0.14399

A and  $\mu$  are given in the Table for Penumbra, and the values of log E, log F, log G, and log H may be obtained from the corresponding values for Penumbra, by numerically increasing log E and decreasing log F by 0.000004, and by numerically decreasing log G by 0.000028, and increasing log H by 0.000029.

## CHANGES OF THE QUANTITIES IN THE TABLES OF DATA IN UNITS OF THE SIXTH PLACE OF DECIMALS.

Washington Mean Time.	For one Minute.			For one Second.		
	A.	B.	C.	A.	B.	C.
<sup>h</sup> <sup>m</sup>						
15 30	+8462.2	+2852.3	+2846.0	+141.04	+47.54	+47.43
16 0	8462.1	2854.9	2848.9	141.03	47.58	47.48
16 30	8461.8	2857.3	2851.7	141.03	47.62	47.53
17 0	8461.4	2859.7	2854.4	141.02	47.66	47.57
17 30	8460.8	2862.0	2857.0	141.01	47.70	47.62
18 0	8460.1	2864.2	2859.5	141.00	47.74	47.66
18 30	8459.2	2866.3	2862.0	140.99	47.77	47.70
19 0	8458.1	2868.2	2864.4	140.97	47.80	47.74
19 30	8456.8	2870.0	2866.7	140.95	47.83	47.78
20 0	8455.4	2871.7	2869.1	140.92	47.86	47.82
20 30	8453.9	2873.7	2871.3	140.90	47.89	47.85
21 0	8452.2	2875.4	2873.4	140.87	47.92	47.89
21 30	8450.3	2877.0	2875.3	140.84	47.95	47.92
22 0	+8448.3	+2878.6	+2877.1	+140.80	+47.96	+47.95

# OUTLINES AND PATH OF THE PENUMBRA, AND THE CENTRAL LINE OF THE ANNULAR ECLIPSE OF JANUARY 21, 1879.



II. An Annular Eclipse of the Sun, July 18, 1879, invisible at Washington, with the following elements:

Washington mean time of  $\delta$  in Right Ascension, July 18<sup>d</sup> 16<sup>h</sup> 0<sup>m</sup> 51.6<sup>s</sup>.

Sun and Moon's R. A.	7 <sup>h</sup> 53 <sup>m</sup> 10.18 <sup>s</sup>	Hourly Motions,	10.04 and 133.48
Sun's Declination,	+20° 54' 36".4	Hourly Motion,	— 0' 27".0
Moon's Declination,	+20 46 9.1	" "	— 9 2.2
Sun's Equa. Hor. Par.	8.7	True Semidiameter,	15 44.5
Moon's Equa. Hor. Par.	56 32.4	" "	15 23.7

From these elements may be deduced the following results:—

Eclipse begins on the Earth July 18<sup>d</sup> 13<sup>h</sup> 2<sup>m</sup>.2, Washington mean time, in longitude 71° 52'.3 East from Washington, and in latitude 10° 30'.8 North.

Central Eclipse begins on the Earth 14<sup>h</sup> 4<sup>m</sup>.8, in longitude 57° 17'.9 East from Washington, and in latitude 7° 47'.2 North.

Central Eclipse at Noon 16<sup>h</sup> 0<sup>m</sup>.9, in longitude 121° 17'.0 East from Washington, and in latitude 12° 19'.4 North.

Central Eclipse ends on the Earth 17<sup>h</sup> 47<sup>m</sup>.2, in longitude 175° 15'.4 East from Washington, and in latitude 23° 14'.4 South.

Eclipse ends on the Earth 18<sup>h</sup> 49<sup>m</sup>.7, in longitude 160° 51'.3 East from Washington, and in latitude 20° 30'.8 South.

DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
<sup>h</sup> <sup>m</sup>				9.97	9.96	+9.54	+9.55	
13 0	—1.54234	+0.86057	—0.24545	1113	9584	7726	8178	193° 29' 54".3
13 10	1.45708	0.83534	0.27067	1116	9587	7702	8155	195 59 54.6
13 20	1.37181	0.81010	0.29589	1120	9591	7679	8132	198 29 55.0
13 30	1.28654	0.78484	0.32112	1123	9594	7655	8108	200 59 55.3
13 40	1.20127	0.75958	0.34636	1127	9598	7631	8085	203 29 55.6
13 50	1.11600	0.73431	0.37161	1130	9601	7607	8062	205 59 56.0
14 0	1.03072	0.70903	0.39687	1133	9605	7583	8039	208 29 56.3
14 10	0.94544	0.68374	0.42214	1137	9608	7559	8016	210 59 56.7
14 20	0.86016	0.65844	0.44741	1140	9612	7535	7992	213 29 57.0
14 30	0.77489	0.63314	0.47269	1144	9615	7511	7969	215 59 57.3
14 40	0.68961	0.60783	0.49798	1147	9619	7488	7946	218 29 57.7
14 50	0.60433	0.58251	0.52327	1150	9622	7464	7923	220 59 58.0
15 0	0.51906	0.55717	0.54857	1154	9626	7440	7899	223 29 58.4
15 10	0.43378	0.53183	0.57388	1157	9629	7416	7876	225 59 58.7
15 20	0.34850	0.50648	0.59919	1161	9633	7392	7853	228 29 59.0
15 30	0.26322	0.48112	0.62451	1164	9636	7368	7830	230 59 59.4
15 40	0.17794	0.45575	0.64984	1167	9640	7344	7806	233 29 59.7
15 50	0.09266	0.43038	0.67518	1171	9643	7320	7783	236 0 0.1
16 0	—0.00739	0.40500	0.70052	1174	9647	7296	7760	238 30 0.4
16 10	+0.07789	0.37961	0.72587	1178	9650	7272	7736	241 0 0.7
16 20	0.16317	0.35421	0.75123	1181	9654	7248	7713	243 30 1.1
16 30	0.24844	0.32881	0.77659	1184	9657	7224	7690	246 0 1.4
16 40	0.33371	0.30340	0.80196	1188	9661	7200	7667	248 30 1.7
16 50	0.41898	0.27798	0.82733	1191	9664	7176	7643	251 0 2.1
17 0	0.50425	0.25255	0.85271	1195	9668	7152	7620	253 30 2.4
17 10	0.58952	0.22712	0.87810	1198	9671	7128	7597	256 0 2.8
17 20	0.67479	0.20168	0.90349	1201	9675	7105	7573	258 30 3.1
17 30	0.76005	0.17623	0.92889	1205	9678	7081	7550	261 0 3.5
17 40	0.84531	0.15078	0.95429	1208	9682	7057	7527	263 30 3.8
17 50	+0.93057	+0.12532	—0.97970	1212	9685	7033	7503	266 0 4.2

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
<sup>h</sup> <sup>m</sup>				9.97	9.96	+9.54	+9.55	
18 0	+1.01583	+0.09986	-1.00512	1215	9689	7009	7480	268° 30' 4.5"
18 10	1.10109	0.07439	1.03054	1218	9692	6985	7457	271 0 4.9
18 20	1.18634	0.04891	1.05596	1222	9696	6961	7433	273 30 5.2
18 30	1.27159	+0.02343	1.08139	1225	9699	6937	7410	276 0 5.6
18 40	1.35684	-0.00206	1.10682	1229	9703	6913	7387	278 30 5.9
18 50	+1.44209	-0.02755	-1.13225	1232	9706	6889	7363	281 0 6.2

## FOR SHADOW.

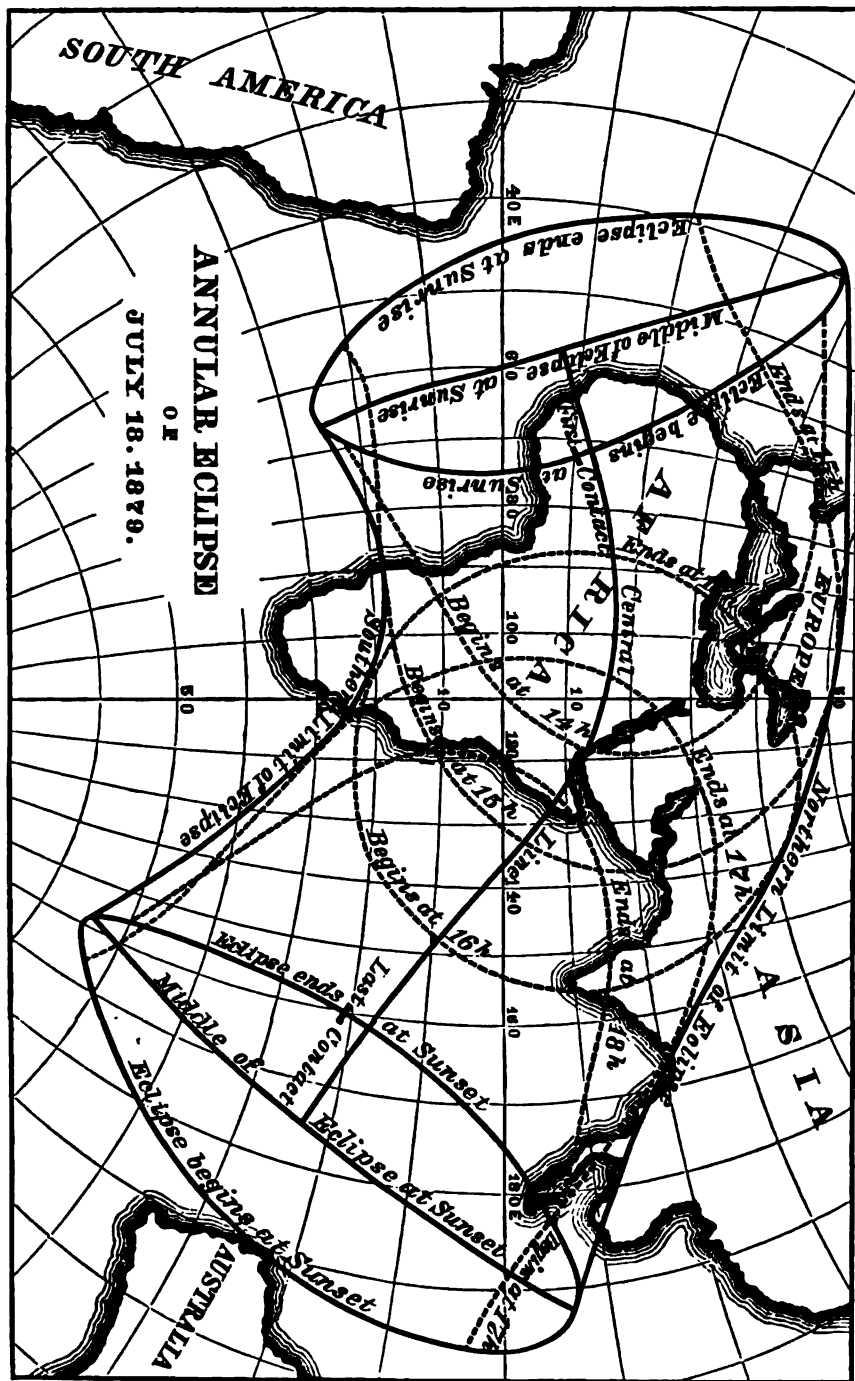
Washington Mean Time.	B.	C.	Washington Mean Time.	B.	C.
<sup>h</sup> <sup>m</sup>			<sup>h</sup> <sup>m</sup>		
14 0	+0.16244	+0.14972	16 0	-0.14159	-0.15393
14 10	0.13715	0.12445	16 10	0.16698	0.17928
14 20	0.11185	0.09918	16 20	0.19238	0.20464
14 30	0.08655	0.07390	16 30	0.21778	0.23000
14 40	0.06124	0.04861	16 40	0.24318	0.25538
14 50	0.03592	+0.02332	16 50	0.26860	0.28075
15 0	+0.01058	-0.00198	17 0	0.29403	0.30613
15 10	-0.01476	0.02729	17 10	0.31946	0.33152
15 20	0.04011	0.05260	17 20	0.34490	0.35691
15 30	0.06547	0.07792	17 30	0.37035	0.38231
15 40	0.09084	0.10325	17 40	0.39580	0.40771
15 50	-0.11621	-0.12859	17 50	-0.42126	-0.43312

A and  $\mu$  are given in the Table for Penumbra, and the values of log E, log F, log G, and log H may be obtained from the corresponding values for Penumbra, by numerically decreasing log E and increasing log F by 0.000004, and by numerically increasing log G by 0.000027, and decreasing log H by 0.000026.

## CHANGES OF THE QUANTITIES IN THE TABLES OF DATA IN UNITS OF THE SIXTH PLACE OF DECIMALS.

Washington Mean Time.	For one Minute.			For one Second.		
	A.	B.	C.	A'.	B'.	C'.
<sup>h</sup> <sup>m</sup>						
13 0	+8526.5	-2523.0	-2521.3	+142.11	-42.05	-42.02
13 30	8527.0	2525.7	2523.7	142.12	42.09	42.06
14 0	8527.4	2528.4	2526.0	142.12	42.14	42.10
14 30	8527.7	2531.0	2528.3	142.13	42.18	42.14
15 0	8527.8	2533.7	2530.4	142.13	42.23	42.17
15 30	8527.8	2536.2	2532.5	142.13	42.27	42.21
16 0	8527.6	2538.6	2534.5	142.13	42.31	42.24
16 30	8527.3	2540.8	2536.5	142.12	42.35	42.27
17 0	8526.9	2542.9	2538.4	142.11	42.38	42.31
17 30	8526.3	2544.8	2540.2	142.10	42.41	42.34
18 0	8525.7	2546.7	2541.6	142.09	42.44	42.36
18 30	8525.0	2548.5	2542.8	142.08	42.47	42.38
19 0	+8524.3	-2550.3	-2543.8	+142.07	-42.50	-42.40

OUTLINES AND PATH OF THE PENUMBRA, AND THE CENTRAL LINE OF THE ANNULAR ECLIPSE OF JULY 18, 1879.





III. A Partial Eclipse of the Moon, December 27-28, 1879, invisible at Washington, with the following elements :

Washington mean time of $\delta$ in Right Ascension, December 27 <sup>d</sup> 22 <sup>h</sup> 59 <sup>m</sup> 58.4 <sup>s</sup> .			
Sun's Right Ascension,	18 <sup>h</sup> 28 <sup>m</sup> 43.90 <sup>s</sup>	Hourly Motion,	10.08
Moon's Right Ascension,	6 28 43.90	" "	131.78
Sun's Declination,	-23° 17' 42".4	Hourly Motion,	+ 0' 7.6
Moon's Declination,	+24 7 42.8	" "	- 4 15.8
Sun's Equa. Hor. Par.	9.0	True Semidiameter,	.16 16.1
Moon's Equa. Hor. Par.	54 38.7	" "	14 52.7

From these elements may be deduced the following results:—

Moon enters Penumbra, December	27 <sup>d</sup> 20 <sup>h</sup> 43.2 <sup>m</sup>	Washington mean time.
Moon enters Shadow,	27 22 27.6	" "
Middle of Eclipse,	27 23 15.6	" "
Moon leaves Shadow,	28 0 3.5	" "
Moon leaves Penumbra,	28 1 47.9	" "

First contact of Shadow with Moon's limb 164° from the north point towards the East, when the Moon is in the zenith, in longitude 156° 44' West from Washington, and in latitude 24° 9' North.

Last contact of Shadow with Moon's limb 147° from the north point towards the West, when the Moon is in the zenith, in longitude 179° 55' West from Washington, and in latitude 24° 12' North.

Magnitude of the Eclipse = 0.164 (Moon's diameter = 1).

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

January.

STAR'S—					AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H		Y	z'	y'	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					N'n.	S'n.
$\eta$ Piscium	3 $\frac{1}{2}$	+1.12	+10.7	+14 43.5	1 3 36.9	- 3 3.6	-0.2342	.5034	+2106	+36	-50	
101 Piscium	6	1.15	10.6	14 2.7	5 53.6	- 0 50.8	+0.9938	.5045	.2083	+90	+17	
105 Piscium	6	1.17	11.1	15 47.7	7 55.6	+ 1 7.6	-0.5188	.5056	.2061	+15	-66	
3 Arietis	6 $\frac{1}{2}$	1.20	11.4	16 48.5	11 32.1	+ 4 37.9	-0.9032	.5076	.2021	- 7	-73	
4 Arietis	6	1.22	11.4	16 21.4	12 22.4	+ 5 26.8	-0.2349	.5083	.2012	+30	-48	
$\epsilon$ Arietis	6	+1.27	+11.6	+17 13.8	17 7.1	+10 3.1	-0.2580	.5107	+1956	+29	-49	
B. A. C. 632	6	1.31	11.6	17 40.6	20 23.0	-10 47.0	-0.1181	.5126	.1916	+36	-41	
15 Arietis	6	1.36	12.0	18 56.0	23 52.8	- 7 23.3	-0.8435	.5148	.1871	- 4	-71	
$\theta$ Arietis	5 $\frac{1}{2}$	1.38	12.2	19 20.7	3 40.3	- 3 42.7	-0.5793	.5172	.1819	+11	-66	
26 Arietis	6	1.52	12.1	19 19.3	9 54.6	+ 2 20.2	+0.5341	.5213	.1730	+78	- 5	
$\nu$ Arietis	5 $\frac{1}{2}$	+1.56	+12.7	+21 26.4	13 54.7	+ 6 12.8	-1.1192	.5240	+1668	-25	-69	
$\mu$ Arietis	5 $\frac{1}{2}$	1.57	11.9	19 29.9	15 40.6	+ 7 55.4	+1.3086	.5252	.1639	+90	+55	
$\epsilon$ Arietis	4 $\frac{1}{2}$	1.67	12.1	20 51.5	23 47.7	- 8 12.9	+1.0872	.5309	.1503	+90	+32	
64 Arietis	6	1.86	12.5	24 17.8	3 11 32.5	+ 3 8.9	-1.0385	.5393	.1286	-20	-66	
66 Arietis	6 $\frac{1}{2}$	1.87	11.8	22 23.4	13 29.7	+ 5 2.3	+1.2945	.5406	.1248	+90	+59	
7 Tauri, mult.	6	+1.91	+12.0	+24 3.6	16 13.3	+ 7 40.4	-0.1983	.5427	+1192	+32	-36	
9 Tauri	6	1.91	11.7	22 48.8	17 24.1	+ 8 48.8	+1.3026	.5435	.1169	+90	+64	
11 Tauri	6	1.95	12.1	24 56.4	19 5.6	+10 26.9	-0.8235	.5446	.1134	- 5	-65	
$\zeta$ Pleiadum	5 $\frac{1}{2}$	1.96	11.8	23 54.7	20 56.8	-11 45.6	+0.5046	.5460	.1094	+77	+ 1	
$\delta$ Pleiadum	4	1.96	11.8	23 44.1	20 58.9	-11 43.6	+0.6998	.5460	.1093	+90	+12	
$\omega$ Pleiadum	7	+1.97	+11.9	+24 27.6	21 5.7	-11 37.1	-0.0781	.5460	+1092	+38	-20	
$\epsilon$ Pleiadum	5	1.97	11.8	24 5.4	21 7.5	-11 35.2	+0.3295	.5461	.1090	+63	- 8	
$\epsilon$ Pleiadum	5	1.97	11.8	23 59.5	21 24.4	-11 19.0	+0.4670	.5462	.1186	+74	- 1	
$\delta$ Pleiadum	5	1.97	11.6	23 34.4	21 38.6	-11 5.2	+0.9480	.5465	.1080	+90	+27	
$\eta$ Tauri	3	1.98	11.6	23 44.0	22 9.8	-10 35.1	+0.8297	.5468	.1069	+90	+19	
$f$ Pleiadum	4	+1.98	+11.5	+23 41.1	22 55.2	- 9 51.2	+0.9616	.5473	+1051	+90	+28	
$k$ Pleiadum	5 $\frac{1}{2}$	1.98	11.5	23 46.1	22 55.8	- 9 50.6	+0.8712	.5473	.1051	+90	+22	
B. A. C. 1192	6 $\frac{1}{2}$	2.00	11.8	25 12.9	23 24.6	- 9 22.9	-0.6519	.5476	.1043	+ 6	-62	
$p$ Tauri	6	2.15	11.4	26 10.1	4 8 32.4	- 0 34.0	-0.8256	.5536	.0838	- 5	-64	
$\chi$ Tauri	5 $\frac{1}{2}$	2.19	10.7	25 20.7	13 42.7	+ 4 25.4	+0.4686	.5569	.0719	+74	+ 3	
$\gamma$ Tauri	3 $\frac{1}{2}$	+2.19	+10.7	+25 21.0	13 43.0	+ 4 25.7	-0.4643	.5569	+0718	+74	+ 3	
B. A. C. 1648	6 $\frac{1}{2}$	2.49	8.2	27 50.1	5 14 37.3	+ 4 25.9	-1.1929	.5684	+0066	-39	-62	
B. A. C. 1746	6 $\frac{1}{2}$	2.55	7.2	27 35.0	20 53.0	+10 27.7	-0.9200	.5704	-0079	-13	-63	
125 Tauri	6	2.53	6.8	25 49.8	22 31.0	-11 57.9	+0.9356	.5708	.0126	+90	+35	
136 Tauri	5	2.60	6.1	27 33.0	6 4 7.9	- 6 33.6	-1.0442	.5720	.0277	-22	-63	
139 Tauri	5 $\frac{1}{2}$	+2.58	+ 5.6	+25 56.3	6 6.7	- 4 39.2	+0.6443	.5722	-0328	+90	+16	
B. A. C. 2154	6 $\frac{1}{2}$	2.63	2.9	24 41.3	22 30.9	+11 8.1	+1.0580	.5728	.0772	+90	+38	
$\epsilon$ Geminorum	3 $\frac{1}{2}$	2.66	2.6	25 15.0	7 1 11.5	-10 17.3	+0.2499	.5725	.0840	+58	- 9	
37 Geminorum	6	2.69	1.8	25 31.5	5 55.4	- 5 44.0	-0.4675	.5718	.0966	+16	-49	
40 Geminorum	6 $\frac{1}{2}$	2.70	1.6	26 4.6	7 38.4	- 4 4.8	-1.2153	.5715	.1010	-40	-64	
$\omega$ Geminorum	6	+2.67	+ 1.0	+24 23.2	8 54.7	- 2 51.4	+0.4295	.5712	-1038	+71	- 2	
48 Geminorum	6	2.67	0.7	24 19.8	13 6.5	+ 1 11.1	+0.0288	.5703	.1146	+45	-23	
52 Geminorum	6	2.69	+ 0.6	25 5.5	14 2.0	+ 2 4.5	-0.8764	.5700	.1171	- 8	-65	
$\nu$ GEM				23 8.4	15 34.2	+ 3 33.3	+0.9863	.5658	.1253	+90	+29	
58 Geminorum	6	2.65	- 0.2	23 10.6	17 45.9	+ 5 40.2	+0.6736	.5690	.1262	+90	+ 9	
84 Geminorum	6 $\frac{1}{2}$	+2.65	- 2.2	+22 38.8	8 6 18.4	- 6 14.9	-0.5437	.5650	-1556	+13	-59	
7 Cancri	6 $\frac{1}{2}$	2.62	2.9	22 24.6	10 57.3	- 1 46.1	-1.0433	.5632	.1659	-19	-68	
$\mu$ Cancri	5 $\frac{1}{2}$	2.61	3.1	21 55.9	12 39.0	- 0 8.1	-0.8320	.5625	.1695	- 4	-68	
B. A. C. 2788	6	2.58	3.9	21 7.7	18 7.1	+ 5 8.3	-0.9554	.5601	.1809	-12	-69	
$\delta$ Cancri	6	2.53	4.0	18 43.1	19 28.8	+ 6 27.0	+1.2918	.5595	.1835	+90	+50	
$\theta$ Cancri	6	+2.51	- 4.3	+18 30.1	23 4.8	+ 9 55.4	+0.8420	.5580	-1905	+90	+12	
B. A. C. 2854	6	2.53	4.4	19 23.6	23 6.1	+ 9 56.6	-0.0839	.5580	.1905	+38	-37	
35 Cancri	6 $\frac{1}{2}$	2.55	4.8	20 0.1	9 0 41.3	+11 28.5	-1.0177	.5573	.1935	-16	-70	
$\delta$ Cancri	4	2.49	5.3	18 35.8	4 50.5	- 8 31.2	-0.3855	.5554	.2012	+22	-55	
$\alpha$ Cancri	6	+2.41	- 5.6	+15 47.1	10 27.8	- 3 5.5	+1.3530	.5528	-2108	+90	+60	

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

January.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$								
$\alpha^2$ Cancri	6	+2.41	-5.6	+16 2.6	<sup>d</sup> 9 10 36.7	- 2 57.0	+1.0556	.5528	-2110	+90	+23
$\pi^1$ Cancri	6 $\frac{1}{2}$	2.36	6.5	15 28.9	17 15.6	+ 3 28.2	+0.1944	.5497	.2214	+54	-26
$\pi^2$ Cancri	6	2.35	6.7	15 26.5	18 33.3	+ 4 43.2	-0.0522	.5490	.2234	+40	-39
18 Leonis	6	2.23	7.9	12 21.9	<b>10</b> 8 50.0	- 5 29.1	-0.2254	.5429	.2419	+31	-51
B. A. C. 3345	6	2.22	7.9	11 59.2	9 22.5	- 4 57.7	+0.0313	.5427	.2424	+45	-38
A Leonis	5	+2.13	-8.6	+10 35.3	18 51.0	+ 4 11.9	-0.8831	.5394	-.2519	- 5	-80
B. A. C. 3529	6	2.04	8.3	7 2.2	<b>11</b> 0 48.2	+ 9 57.5	+1.2252	.5376	.2567	+90	+30
43 Leonis	6	2.03	8.5	7 9.2	1 57.8	+11 4.8	+0.8063	.5373	.2576	+90	+ 1
48 Leonis	6	1.99	9.1	7 34.4	7 31.5	- 7 32.4	-1.0649	.5359	.2614	-16	-83
34 Sextantis	6	1.92	8.5	4 12.7	11 15.2	- 3 56.0	+1.3797	.5352	.2634	+90	+49
35 Sextant. mult.	6	+1.93	-8.9	+ 5 22.8	11 34.7	- 3 37.2	+0.1054	.5351	-.2636	+49	-37
$\delta$ Leonis	5	1.85	9.3	4 15.8	19 45.6	+ 4 17.8	-0.9298	.5340	.2669	- 7	-86
$\rho^3$ Leonis	6	1.81	9.0	2 36.6	22 48.6	+ 7 14.8	-0.0636	.5336	.2677	+40	-46
$\rho^4$ Leonis	5	1.77	8.6	0 35.2	<b>12</b> 2 4.0	+10 24.0	+1.1192	.5336	.2683	+90	+20
B. A. C. 3536	6	1.78	9.3	2 54.6	2 6.9	+10 26.8	-1.2537	.5334	.2683	-32	-87
76 Leonis	6	+1.75	-9.3	+ 2 18.7	4 30.7	-11 14.0	-1.2888	.5333	-.2686	-34	-88
$\epsilon$ Leonis	4 $\frac{1}{2}$	1.66	9.1	- 0 9.5	13 5.6	- 2 55.8	-1.0869	.5334	.2686	-18	-90
B. A. C. 4201	6	1.36	8.2	8 0.5	<b>13</b> 13 8.7	- 3 39.6	+0.4923	.5380	.2594	+70	-17
$\eta$ Virginis	6	1.35	7.8	8 47.2	15 51.1	- 1 2.7	+0.5816	.5388	.2576	+76	-12
B. A. C. 4312	6 $\frac{1}{2}$	1.25	7.6	9 40.9	23 58.2	+ 6 48.2	-0.5759	.5417	.2509	+11	-80
69 Virginis	5 $\frac{1}{2}$	+1.07	-6.0	-15 20.9	<b>14</b> 16 15.8	- 1 25.4	+1.2131	.5495	-.2326	+75	+30
75 Virginis	6	0.04	6.3	14 44.6	18 40.3	+ 0 52.1	+0.0476	.5509	.2294	+40	-40
83 Virginis	6	0.99	6.2	15 34.4	23 47.5	+ 5 48.6	-0.2678	.5540	.2220	+23	-58
85 Virginis	6	0.99	6.4	15 9.8	<b>15</b> 0 16.6	+ 6 16.7	-0.7911	.5542	.2212	- 5	-90
87 Virginis	6	0.98	5.6	17 15.3	1 3.2	+ 7 1.6	+1.1590	.5547	.2200	+73	+26
80 Virginis	5	+0.96	-5.5	-17 32.0	2 7.8	+ 8 4.0	+1.2036	.5554	-.2183	+73	+30
B. A. C. 4722	6	0.83	5.7	17 38.2	13 8.8	- 5 18.6	-0.9963	.5620	.1997	-21	-90
B. A. C. 4739	6 $\frac{1}{2}$	0.82	5.6	18 9.3	14 30.7	- 3 59.8	-0.7410	.5628	.1973	- 6	-90
B. A. C. 4923	6	0.64	5.0	20 52.1	<b>16</b> 6 37.7	+11 31.4	-0.9039	.5727	.1637	-18	-90
B. A. C. 4984	6	0.58	4.3	23 31.3	11 43.0	- 7 34.8	+0.9906	.5757	.1518	+67	+16
B. A. C. 5023	6	+0.56	-4.8	-21 57.2	14 23.1	- 5 0.9	-1.0030	.5772	-.1456	-28	-90
42 Libræ	5 $\frac{1}{2}$	0.46	4.2	23 25.4	23 56.5	+ 4 10.4	-0.7832	.5824	.1214	-16	-80
B. A. C. 5197	6	0.44	4.3	24 20.1	<b>17</b> 2 8.0	+ 6 16.7	-0.1161	.5834	.1156	+19	-50
$\delta$ Scorpii	5	0.42	4.4	25 23.0	4 8.7	+ 8 12.6	+0.7256	.5844	.1102	+65	- 2
A <sup>3</sup> Scorpii, mult.	5	0.41	4.0	24 57.9	5 11.6	+ 9 13.0	+0.1861	.5849	.1074	+34	-32
B. A. C. 5253	6	+0.41	-4.4	-24 10.3	5 19.3	+ 9 20.4	-0.6364	.5850	-.1069	- 9	-90
B. A. C. 5254	6	0.41	4.5	23 37.0	5 20.7	+ 9 21.8	-1.2061	.5850	.1068	-49	-90
B. A. C. 5255	6	0.41	4.0	25 3.0	5 25.6	+ 9 26.6	+0.2478	.5850	.1066	+37	-29
3 Scorpii	6	0.41	4.2	24 53.2	5 36.4	+ 9 36.9	+0.0612	.5850	.1065	+27	-39
4 Scorpii	6	0.40	3.9	25 54.6	5 55.3	+ 9 55.0	+1.0723	.5852	.1053	+64	+24
B. A. C. 5286	6 $\frac{1}{2}$	+0.39	-4.3	-24 28.9	7 9.6	+11 6.4	-0.5133	.5857	-.1020	- 3	-78
$\pi$ Scorpii	3	0.38	4.0	25 45.9	7 14.6	+11 11.2	+0.7874	.5888	.1017	+65	+ 3
B. A. C. 5314	6	0.36	4.1	25 31.7	9 0.9	-11 6.8	+0.3704	.5865	.0968	+43	-22
B. A. C. 5347	5	0.34	4.0	26 0.1	10 52.3	- 9 19.8	+0.6792	.5873	.0917	+62	-04
$\sigma$ Scorpii	3 $\frac{1}{2}$	0.30	4.2	25 18.1	15 59.6	- 4 24.6	-0.4692	.5891	.0773	- 3	-74
$\alpha$ Scorpii, mult.	1 $\frac{1}{2}$	+0.27	-4.0	-26 9.8	19 10.5	- 1 21.3	+0.1794	.5899	-.0680	+30	-33
22 Scorpii	5	0.27	4.3	24 50.8	19 30.7	- 1 2.0	-1.1882	.5899	.0672	-51	-90
25 Scorpii	6	0.21	4.3	25 18.6	<b>18</b> 1 57.5	+ 5 9.3	-1.0872	.5912	.0481	-43	-90
B. A. C. 5800	6 $\frac{1}{2}$	0.14	4.0	26 50.3	12 30.7	- 8 43.0	+0.1360	.5918	.0167	+23	-35
A <sup>1</sup> Ophiuchi	5	0.13	4.1	26 25.5	12 58.7	- 8 16.1	-0.2968	.5918	.0152	0	-61
A <sup>2</sup> Ophiuchi	6	+0.13	-4.1	-26 25.4	12 58.8	- 8 16.0	-0.2979	.5918	-.0152	0	-62
38 Ophiuchi	6 $\frac{1}{2}$	0.13	4.1	26 29.7	13 50.6	- 7 26.3	-0.2361	.5918	-.0125	+ 3	-57
B. A. C. 5909	6 $\frac{1}{2}$	0.09	4.2	26 29.6	19 18.0	- 2 12.1	-0.5884	.5913	+0.0037	-16	-86
3 Sagittarii	5	0.05	3.9	27 47.0	<b>19</b> 1 24.5	+ 3 39.9	+1.1442	.5902	.0219	+62	+33
B. A. C. 6024	6 $\frac{1}{2}$	+0.04	-4.1	-27 1.3	2 31.0	+ 4 43.5	+0.3857	.5899	+0.252	+38	-21

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

January.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$z'$	$y'$	N'n.	S'n.
B. A. C. 6194	6 $\frac{1}{2}$	0.00 - 4.3	-27 5.2	19 13 23.1	- 8 50.4	+0.9018	.5865	+0.0567	+63	+11
B. A. C. 6217	6 $\frac{1}{2}$	-0.01 4.6	24 58.1	14 48.4	- 7 28.4	-1.2034	.5860	.0607	-53	-90
$\lambda$ Sagittarii	3	0.02 4.6	25 29.5	17 21.6	- 5 1.2	-0.5014	.5848	.0680	- 6	-77
B. A. C. 6369	6	0.05 4.7	25 8.2	20 0 6.8	+ 1 28.3	-0.3447	.5813	.0864	+ 4	-64
$\psi$ Sagittarii	5	-0.08 4.6	25 27.8	12 39.4	-10 27.8	+1.2882	.5731	.1187	+65	+53
$\lambda$ Capricorni	5 $\frac{1}{2}$	+0.01 - 2.9	-11 55.4	23 9 57.6	+ 8 29.9	-0.2194	.5189	+2314	+28	-55
B. A. C. 7620	6	0.02 2.6	10 52.8	13 34.0	+11 59.8	-0.4990	.5166	.2342	+14	-74
B. A. C. 7697	6	0.06 1.4	11 2.2	20 36.6	- 5 10.3	+1.3391	.5123	.2390	+79	+43
$\theta$ Aquarii	4 $\frac{1}{2}$	0.06 1.7	8 23.1	24 1 35.9	- 0 19.7	-0.3165	.5096	.2420	+25	-61
B. A. C. 7774	6	0.07 1.9	9 38.6	1 37.1	- 0 18.6	+1.0605	.5096	.2420	+30	+15
$\rho$ Aquarii	5 $\frac{1}{2}$	+0.07 - 1.8	- 8 25.7	3 22.4	+ 1 23.7	+0.1595	.5087	+2429	+50	-34
B. A. C. 8152	6 $\frac{1}{2}$	0.23 + 1.4	- 0 22.4	25 13 39.4	+10 42.9	-0.0917	.4955	.2498	+38	-48
$\pi$ Piscium	4 $\frac{1}{2}$	0.24 1.8	+ 0 53.6	15 32.5	-11 27.2	-0.6797	.4951	.2496	+ 7	-88
9 Piscium	6	0.24 1.7	0 27.5	15 43.0	-11 17.0	-0.4879	.4951	.2496	+18	-72
15 Piscium	6 $\frac{1}{2}$	0.27 1.9	0 38.7	20 16.8	- 6 50.7	+0.4455	.4943	.2490	+69	-20
16 Piscium	6	+0.27 + 2.2	+ 1 25.9	20 47.5	- 6 20.8	-0.2895	.4942	+2489	+28	-59
$\lambda$ Piscium	5	0.29 2.2	1 6.9	23 55.8	- 3 17.7	+0.8383	.4937	.2483	+90	+ 2
19 Piscium	6	0.30 2.9	2 49.1	26 2 20.4	- 0 57.0	-0.4321	.4934	.2477	+31	-68
B. A. C. 8276	6 $\frac{1}{2}$	0.32 2.4	1 32.7	3 40.7	+ 0 21.1	+1.2966	.4933	.2474	+90	+35
22 Piscium	6	0.33 2.8	2 15.6	5 25.9	+ 2 3.4	+0.9449	.4932	.2468	+90	+ 8
$\delta$ Piscium	5 $\frac{1}{2}$	+0.43 + 5.3	+ 7 31.2	21 20.1	- 6 28.3	-0.9674	.4933	+2404	- 9	-83
45 Piscium	6	0.46 5.2	7 1.4	27 0 9.5	- 3 43.5	+0.2563	.4935	.2388	+57	-28
75 Piscium	6	0.65 7.7	12 18.6	22 33.0	- 5 57.1	-0.4045	.4980	.2229	+21	-62
$\eta$ Piscium	3 $\frac{1}{2}$	0.80 8.9	14 43.5	25 11 54.4	+ 7 1.7	-0.1799	.5028	.2102	+33	-47
101 Piscium	6	0.82 8.7	14 2.7	14 11.4	+ 9 14.8	+1.0491	.5037	.2078	+90	+21
105 Piscium	6	+0.84 + 9.4	+15 47.6	16 13.7	+11 13.5	-0.4656	.5047	+2057	+18	-62
3 Arietis	6 $\frac{1}{2}$	0.88 9.7	16 48.5	19 50.7	- 9 15.6	-0.8519	.5064	.2016	- 4	-73
4 Arietis	6	0.89 9.5	16 21.4	20 41.2	- 8 26.6	-0.1829	.5067	.2006	+33	-46
$\epsilon$ Arietis	6	0.94 9.9	17 13.8	29 1 27.0	- 3 49.2	-0.2072	.5091	.1948	-32	-46
B. A. C. 632	6	0.98 10.1	17 40.5	4 43.8	- 0 38.2	-0.0682	.5108	.1906	+39	-38
15 Arietis	6	+1.03 +10.9	+18 55.9	8 14.8	+ 2 46.6	-0.7958	.5126	+1859	- 1	-71
$\theta$ Arietis	5 $\frac{1}{2}$	1.08 11.0	19 20.6	12 3.7	+ 6 28.6	-0.5505	.5147	.1807	+13	-64
26 Arietis	6	1.16 10.8	19 19.2	18 20.7	-11 25.8	+0.5818	.5185	.1716	+32	- 2
$\nu$ Arietis	5 $\frac{1}{2}$	1.22 11.7	21 26.4	22 22.8	- 7 31.2	-1.0777	.5210	.1654	+21	-69
$\epsilon$ Arietis, mult.	4 $\frac{1}{2}$	1.36 11.3	20 51.5	20 8 21.4	+ 2 8.7	+1.1324	.5273	.1490	+90	+36
64 Arietis	6	+1.55 +12.1	+24 17.8	20 13.9	-10 21.8	-1.0055	.5351	+1272	-17	-66
7 Tauri, mult.	6	1.61 11.8	24 3.6	31 0 58.0	- 5 47.0	-0.1641	.5382	.1180	+34	-35
11 Tauri	6	1.66 11.9	24 56.4	3 52.5	- 2 58.3	-0.7923	.5400	.1122	- 3	-65
$\rho$ Pleiadum	5 $\frac{1}{2}$	1.69 11.3	23 54.6	5 54.1	- 1 9.4	+0.5403	.5412	.1082	+80	+ 3
$\delta$ Pleiadum	4	1.69 11.4	23 44.1	5 47.3	- 1 7.3	+0.7364	.5412	.1082	+90	+14
$\pi$ Pleiadum	7	+1.69 +11.6	+24 27.6	5 54.1	- 1 0.8	-0.0450	.5413	+1080	+40	-27
$\epsilon$ Pleiadum	5	1.69 11.5	24 5.4	5 55.9	- 0 59.0	+0.3642	.5413	.1078	+66	- 6
$\zeta$ Pleiadum	5	1.70 11.4	23 59.5	6 13.0	- 0 42.5	+0.5022	.5415	.1072	+77	+ 1
$\delta$ Pleiadum	5	1.69 11.3	23 35.4	6 27.4	- 0 28.6	+0.9851	.5417	.1067	+90	+29
$\eta$ Tauri	3	1.70 11.4	23 44.0	6 58.9	+ 0 1.9	+0.8662	.5420	.1057	+90	+22
$f$ Pleiadum	4	+1.71 +11.4	+23 41.1	7 45.0	+ 0 46.4	+0.9988	.5425	+1040	+90	+31
$\lambda$ Pleiadum	5 $\frac{1}{2}$	1.71 11.3	23 46.1	7 45.6	+ 0 47.0	+0.9080	.5425	.1040	+90	+25
B. A. C. 1192	6	1.72 11.8	25 12.9	8 14.7	+ 1 15.1	-0.6217	.5428	.1030	+ 7	-60
$\rho$ Tauri	6	1.88 11.6	26 10.1	17 29.5	+10 11.0	-0.7991	.5484	.0829	- 3	-64
$\chi^1$ Tauri	5 $\frac{1}{2}$	1.96 10.8	25 20.7	22 43.9	- 8 45.5	+0.4985	.5517	.0708	+77	+ 5
$\chi^2$ Tauri	8 $\frac{1}{2}$	+1.96 +10.8	+25 21.0	22 44.1	- 8 45.3	+0.4937	.5517	+0708	+76	+ 5

**ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.**

**February.**

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N <sup>a</sup> .	S <sup>n</sup> .
B. A. C. 1648	6 $\frac{1}{2}$	+2.35 + 9.0	+27° 50.1	d h m 1 23 56.1	h m - 8 27.3	-1.1763	.5642	+0.082	-37	-62
B. A. C. 1746	6 $\frac{1}{2}$	2.44	27 35.1	2 6 15.5	- 2 21.8	-0.9034	.5663	-.0082	-11	-63
125 Tauri	6	2.43	25 49.8	7 54.4	- 0 46.6	+0.9552	.5668	.0124	+90	+37
136 Tauri	5	2.54	27 35.0	13 34.2	+ 4 40.7	-1.0297	.5683	.0276	-21	-63
139 Tauri	5 $\frac{1}{2}$	2.53	25 56.3	15 34.0	+ 6 36.1	+0.6607	.5687	.0305	+90	+17
B. A. C. 2154	6 $\frac{1}{2}$	+2.69 + 3.4	+24 41.3	3 8 3.4	- 1 31.3	+1.0693	.5707	-.0770	+90	+39
$\epsilon$ Geminorum	3 $\frac{1}{2}$	2.73	3.2 25 15.0	10 44.4	+ 1 3.7	+0.2608	.5707	.0851	+58	- 9
37 Geminorum	6	2.78	2.4 25 31.5	15 23.7	+ 5 37.4	-0.4559	.5706	.0964	+17	-49
40 Geminorum	6 $\frac{1}{2}$	2.80	2.2 26 4.6	17 11.8	+ 7 16.7	-1.2034	.5705	.1008	-38	-64
$\omega$ Geminorum	6	2.78	1.7 24 23.2	18 28.0	+ 8 30.0	+0.4386	.5705	.1042	+71	- 1
48 Geminorum	6	+2.81 + 1.0	+24 19.8	22 39.6	-11 27.8	+0.0380	.5699	-.1149	+45	-23
52 Geminorum	6	2.84	1.1 25 5.5	22 34.9	-10 34.5	-0.8648	.5699	.1171	- 7	-65
58 Geminorum	6	2.83 + 0.1	23 10.6	4 3 18.3	- 6 59.4	+0.6803	.5693	.1265	+90	+ 9
84 Geminorum	6 $\frac{1}{2}$	2.87 - 2.1	22 38.8	15 46.6	+ 5 1.2	-0.5342	.5664	.1562	+13	-59
7 Cancri	6 $\frac{1}{2}$	2.88	3.0 22 24.5	20 23.1	+ 9 27.7	-1.0306	.5652	.1667	-18	-68
$\mu^2$ Cancri	5 $\frac{1}{2}$	+2.87 - 3.3	+21 56.0	22 3.8	+11 4.8	-0.8385	.5647	-.1704	- 4	-68
B. A. C. 2788	6	2.89	4.3 21 7.7	5 3 28.3	- 7 42.5	-0.9430	.5630	.1819	-11	-60
$\delta^1$ Cancri	6	2.85	4.7 18 43.1	4 49.0	- 6 24.8	+1.2885	.5625	.1846	+90	+50
$\theta$ Cancri	6	2.82	5.6 18 30.0	8 22.2	- 2 59.2	+0.8414	.5614	.1918	+90	+12
B. A. C. 2854	6	2.84	5.5 19 23.5	8 23.5	- 2 58.0	-0.0778	.5614	.1919	+39	-37
35 Cancri	6 $\frac{1}{2}$	+2.86 - 5.7	+20 0.1	9 57.2	- 1 27.6	-1.0042	.5609	-.1949	-15	-70
$\delta$ Cancri	4	2.84	6.4 18 35.8	14 2.5	+ 2 28.9	-0.3769	.5595	.2028	+23	-54
$\alpha^1$ Cancri	6	2.80	7.5 15 47.0	19 34.4	+ 7 49.0	+1.3465	.5576	.2127	+90	+56
$\alpha^2$ Cancri	6	2.80	7.5 16 2.6	19 43.0	+ 7 57.3	+1.0517	.5575	.2131	+90	+23
$\pi^1$ Cancri	6 $\frac{1}{2}$	2.80	8.5 15 28.9	6 2 14.2	- 9 45.3	+0.1987	.5552	.2238	+54	-26
$\pi^2$ Cancri	6	+2.80 - 8.7	+15 26.4	3 30.5	- 8 31.7	-0.0458	.5548	-.2257	+40	-39
18 Leonis	6	2.72	10.4 12 21.9	17 27.9	+ 4 56.7	-0.2167	.5501	.2450	+31	-51
B. A. C. 3345	6	2.72	10.5 11 59.1	17 59.7	+ 5 27.4	+0.0368	.5500	.2456	+45	-37
A Leonis	5	2.67	11.7 10 35.2	7 3 13.4	- 9 37.8	-0.8640	.5472	.2556	- 3	-80
B. A. C. 3529	6	2.61	11.9 7 2.2	9 0.9	- 4 2.1	+1.2167	.5458	.2607	+90	+30
43 Leonis	6	+2.60 -12.1	+ 7 9.2	10 8.5	- 2 56.8	+0.8041	.5456	-.2616	+90	+ 1
48 Leonis	6	2.58	12.7 7 34.3	15 32.7	+ 2 16.5	-1.0411	.5444	.2655	-14	-83
34 Sextantis	6	2.53	12.6 4 12.7	19 9.8	+ 5 46.3	+1.3712	.5440	.2676	+90	+47
35 Sext., mult.	6	2.55	12.8 5 22.7	19 28.9	+ 6 4.7	+0.1132	.5439	.2677	+49	-36
$\delta$ Leonis	5	2.50	13.5 4 15.8	8 3 24.9	-10 15.2	-0.9051	.5428	.2711	- 5	-86
$\rho^2$ Leonis	6	+2.47 -13.5	+ 2 36.5	6 22.5	- 7 23.5	-0.0509	.5428	-.2719	+40	-45
$\rho^1$ Leonis	5	2.42	13.3 0 35.1	9 31.9	- 4 20.4	+1.1163	.5423	.2727	+90	+20
B. A. C. 3836	6	2.44	13.7 2 54.5	9 34.7	- 4 17.7	-1.2238	.5423	.2727	-29	-87
75 Leonis	5 $\frac{1}{2}$	2.43	13.8 2 40.3	11 8.5	- 2 47.0	-1.4132	.5423	.2729	-55	-88
76 Leonis	6	2.42	13.8 + 2 18.6	11 54.1	- 2 3.0	-1.2578	.5423	.2730	-31	-88
$\nu$ Leonis	4 $\frac{1}{2}$	+2.36 -13.9	- 0 9.6	20 13.5	+ 5 59.8	-1.0580	.5426	-.2730	-15	-90
B. A. C. 4201	6	2.16	13.3 8 0.6	9 19 34.9	+ 4 34.0	+0.5068	.5461	.2631	+71	-17
$\epsilon$ Virginis	6	2.15	13.3 8 47.3	22 13.0	+ 7 6.7	+0.5953	.5466	.2611	+77	-12
B. A. C. 4312	6 $\frac{1}{2}$	2.08	13.1 9 41.0	10 6 7.7	- 9 14.7	-0.5473	.5492	.2541	+12	-77
69 Virginis	5 $\frac{1}{2}$	1.94	11.7 15 21.0	22 4.0	+ 6 8.3	+1.2311	.5555	.2350	+75	+32
75 Virginis	6	+1.92 -11.9	-14 44.7	11 0 25.7	+ 8 24.9	+0.0731	.5565	-.2315	+41	-39
83 Virginis	6	1.87	11.6 15 34.5	5 27.7	-10 43.9	-0.2391	.5587	.2238	+24	-57
85 Virginis	6	1.87	11.7 15 9.9	5 56.3	-10 16.3	-0.7577	.5590	.2230	- 4	-90
87 Virginis	6	1.86	11.2 17 15.4	6 42.2	- 9 32.1	+1.1773	.5593	.2219	+73	+28
89 Virginis	5	1.87	10.8 17 32.0	7 45.8	- 8 30.7	+1.2218	.5598	.2200	+73	+32
B. A. C. 4722	6	+1.74 -10.8	-17 38.3	18 37.9	+ 1 57.7	-0.9618	.5651	-.2006	-19	-90
B. A. C. 4739	6 $\frac{1}{2}$	1.74	10.5 18 9.4	19 58.9	+ 3 15.7	-0.7072	.5657	.1981	- 4	-90
B. A. C. 4923	6	1.58	9.2 20 52.2	12 11 50.1	+ 5 19.8	-0.8706	.5734	.1639	-17	-90
B. A. C. 4984	6	1.55	8.0 23 31.4	17 3.6	- 0 26.9	+1.0195	.5756	.1519	+67	+18
B. A. C. 5023	6	+1.50 - 8.6	-21 57.2	19 43.6	+ 2 7.0	-0.9703	.5768	-.1453	-25	-90

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

### February.

Star's—				At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
42 Labra	5 $\frac{1}{2}$	+1.42	-7.7	-23 25.5	13 5 18.0	+11 19.1	-0.7525	.5805	-.1210	-14 -90
B. A. C. 5197	6	1.40	7.5	24 20.1	7 30.1	-10 33.9	-0.0847	.5812	.1151	+20 -48
b Scorpii	5	1.37	7.2	25 23.0	9 31.3	-8 37.4	+0.7582	.5819	.1097	+65 0
A <sup>s</sup> Scorpi., mult.	5	1.36	7.1	24 58.0	10 34.6	-7 36.6	+0.2178	.5822	.1068	+36 -31
B. A. C. 5253	6	1.35	7.4	24 10.4	10 42.2	-7 29.3	-0.6054	.5822	.1065	-7 -87
B. A. C. 5254	6	+1.34	-7.6	-23 37.0	10 43.7	-7 27.9	-1.1757	.5823	-.1064	-46 -90
B. A. C. 5255	6	1.35	7.1	25 3.1	10 48.6	-7 23.2	+0.2802	.5823	.1062	+39 -27
3 Scorpii	6	1.35	7.2	24 53.2	10 59.5	-7 12.7	+0.0933	.5823	.1058	+29 -37
4 Scorpii	6	1.36	6.7	25 54.7	11 18.5	-6 54.4	+1.1048	.5824	.1049	+64 +27
B. A. C. 5286	6 $\frac{1}{2}$	1.34	7.3	24 48.9	12 33.3	-5 42.5	-0.4828	.5828	.1014	-1 -75
$\pi$ Scorpii	3	+1.34	-6.8	-25 46.0	12 38.2	-5 37.9	+0.8208	.5828	-.1013	+64 +5
B. A. C. 5314	6	1.32	6.9	25 31.8	14 25.3	-3 55.0	+0.4026	.5833	.0963	+45 -20
B. A. C. 5347	5	1.30	6.5	26 0.2	16 17.5	-2 7.2	+0.7120	.5839	.0912	+64 -2
$\sigma$ Scorpii	3 $\frac{1}{2}$	1.24	6.6	25 18.1	21 27.7	+2 50.8	-0.4397	.5851	.0767	-1 -72
$\epsilon$ Scorpi., mult.	1 $\frac{1}{2}$	1.21	6.1	26 9.8	14 0 40.4	+5 55.9	+0.2117	.5856	.0676	+32 -31
22 Scorpii	5	+1.20	-6.6	-24 50.9	1 0.9	+6 15.5	-1.1609	.5858	-.0667	-48 -90
25 Scorpii	6	1.13	6.3	25 18.7	7 32.4	-11 28.5	-1.0615	.5863	.0478	-41 -90
B. A. C. 5800	6 $\frac{1}{2}$	1.03	5.1	26 50.4	18 14.8	-1 11.6	+0.1668	.5861	.0166	+23 -33
A <sup>s</sup> Ophiuchi	5 $\frac{1}{2}$	1.02	5.3	26 25.5	18 43.3	-0 44.2	-0.2684	.5860	.0151	+2 -60
A <sup>s</sup> Ophiuchi	6	1.02	5.3	26 25.4	18 43.3	-0 44.2	-0.2695	.5860	.0151	+2 -60
38 Ophiuchi	6 $\frac{1}{2}$	+1.00	-5.2	-26 29.7	19 36.0	+0 6.4	-0.2074	.5859	-.0126	+5 -56
B. A. C. 5909	6 $\frac{1}{2}$	0.95	5.1	26 10.6	15 1 9.0	+5 26.3	-0.5622	.5850	+0.037	-14 -83
3 Sagittarii	5	0.90	4.2	27 47.0	7 22.2	+11 24.8	+1.1809	.5836	.0215	+62 +37
B. A. C. 6024	6 $\frac{1}{2}$	0.88	4.5	27 1.3	8 30.0	-11 30.1	+0.4166	.5833	.0248	+40 -19
B. A. C. 6194	6	0.77	4.0	27 5.2	19 35.0	-0 50.9	+0.9354	.5793	.0559	+63 +14
B. A. C. 6217	6 $\frac{1}{2}$	+0.73	-4.4	-24 58.1	21 2.0	+0 32.7	-1.1874	.5787	+0.0590	-51 -90
$\lambda$ Sagittarii	3	0.72	4.2	25 29.3	23 38.4	+3 3.1	-0.4800	.5774	.0670	-4 -75
B. A. C. 6369	6	0.66	4.0	25 8.2	16 6 32.1	+9 41.0	-0.3239	.5739	.0853	+5 -63
B. A. C. 6490	6 $\frac{1}{2}$	0.62	3.8	25 0.9	13 51.3	-7 16.3	+0.2419	.5696	.1038	+37 -29
B. A. C. 6576	6	0.57	3.8	24 23.2	19 22.0	-1 57.8	+0.1914	.5661	.1170	+35 -38
$\chi^1$ Sagittarii	6	+0.55	-3.5	-24 44.6	23 30.3	+2 1.5	+1.0705	.5633	+1.266	+63 +23
$\chi^2$ Sagittarii	6 $\frac{1}{2}$	0.55	3.5	24 39.0	23 33.2	+2 4.3	+0.9797	.5633	.1267	+66 +15
$\chi^3$ Sagittarii	6	0.54	3.7	24 11.9	23 37.0	+2 7.9	+0.5119	.5632	.1268	+54 -14
B. A. C. 6699	6 $\frac{1}{2}$	0.51	3.6	23 34.3	17 4 0.0	+6 21.5	+0.4313	.5603	.1367	+51 -19
53 Sagittarii	6	0.50	3.4	23 42.0	5 48.8	+8 6.4	+0.8170	.5591	.1406	+67 +4
B. A. C. 6727	6 $\frac{1}{2}$	+0.49	-3.5	-23 42.2	5 56.3	+8 13.6	+0.8389	.5589	+1.408	+67 +5
B. A. C. 6849	6	0.40	3.4	21 39.3	16 57.4	-5 8.5	+0.3546	.5511	.1631	+49 -23
$\sigma$ Capricorni	5 $\frac{1}{2}$	0.36	3.3	19 29.7	23 31.9	+1 12.6	-0.8224	.5444	.1797	-12 -90
$\pi$ Capricorni	5	0.33	3.5	18 36.4	18 3 11.2	+4 44.5	-1.1143	.5436	.1815	-31 -90
B. A. C. 7053	5 $\frac{1}{2}$	0.34	3.3	18 59.2	4 21.6	+5 52.6	-0.4984	.5427	.1834	+7 -75
$\phi$ Capri., mult.	5 $\frac{1}{2}$	+0.34	-3.3	-18 58.0	4 22.2	+5 53.1	-0.5011	.5427	+1.834	+7 -75
$\nu$ Capricorni	5 $\frac{1}{2}$	0.32	3.2	18 33.8	9 6.6	+10 28.0	-0.0586	.5393	.1910	+30 -46
B. A. C. 7202	6	0.30	3.1	18 38.7	13 3.1	-9 43.1	+0.7297	.5365	.1970	+72 +1
B. A. C. 7209	6 $\frac{1}{2}$	0.29	3.1	18 28.9	13 29.6	-9 17.5	+0.7066	.5362	.1976	+72 -4
19 Capricorni	6	0.29	3.1	18 22.8	16 6.1	-6 46.1	+1.1192	.5343	.2013	+72 +23
B. A. C. 7263	6	+0.27	-3.2	-16 29.8	17 30.3	-5 24.6	-0.6075	.5333	+2.032	+4 -84
$\kappa$ Piscium	4 $\frac{1}{2}$	0.19	+0.8	+0 35.6	21 23 28.1	-1 43.8	-0.7399	.5034	.2498	+4 -84
$\delta$ Piscium	5	0.20	1.1	1 6.9	22 7 49.9	+6 24.2	+0.7734	.4959	.2486	+90 -2
19 Piscium	6	0.21	1.7	2 49.0	10 13.9	+8 44.3	-0.5002	.4957	.2481	+17 -73
B. A. C. 8276	6 $\frac{1}{2}$	0.22	1.5	1 32.7	11 34.0	+10 2.2	+1.2314	.4956	.2478	+90 +29
22 Piscium	6	+0.21	+1.7	+2 15.6	13 18.7	+11 44.0	+0.8754	.4955	+2.473	+90 +4
$\delta$ Piscium	5 $\frac{1}{2}$	0.26	3.1	7 31.2	23 5 8.9	+3 8.2	-1.0495	.4958	.2408	-15 -83
45 Piscium	6	0.28	3.5	7 1.4	24 7 57.5	+5 52.2	+0.1724	.4961	.2393	+52 -32
75 Piscium	6	0.40	5.6	12 18.6	6 15.9	+3 33.6	-0.5029	.5002	.2231	+16 -68
$\gamma$ Piscium	3 $\frac{1}{2}$	+0.48	+6.8	+14 43.4	19 35.7	-7 29.2	-0.2856	.5044	+2.105	+27 -53

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

February.

Star's—					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
101 Piscium	6	+0.51	+ 6.7	+14 2.7	24 21 52.6	- 5 16.3	+0.9448	.5052	+2080	+90	+14
105 Piscium	6	0.52	7.2	15 47.6	23 54.8	- 3 17.6	-0.5742	.5060	.2058	+12	-69
3 Arietis	6½	0.55	7.5	16 48.5	25 3 31.9	+ 0 13.2	-0.9631	.5075	.2014	-11	-73
4 Arietis	6	0.57	7.6	16 21.4	4 22.4	+ 1 2.3	-0.2927	.5078	.2004	+27	-52
5 Arietis	6	0.61	8.0	17 13.8	9 8.5	+ 5 39.9	-0.3196	.5099	.1945	+26	-52
B. A. C. 632	6	+0.64	+ 8.1	+17 40.5	12 25.7	+ 8 51.4	-0.1816	.5113	+1901	+33	-44
15 Arietis	6	0.66	8.6	18 55.9	15 57.2	-11 43.3	-0.9128	.5129	.1854	- 9	-71
8 Arietis	5½	0.70	8.7	19 20.6	19 46.9	- 8 0.5	-0.6685	.5147	.1801	+ 6	-70
26 Arietis	6	0.78	9.0	19 19.2	26 2 5.7	- 1 53.2	+0.4665	.5179	.1710	+73	- 8
7 Arietis	5½	0.82	9.7	21 26.4	6 9.2	+ 2 2.9	-1.2006	.5201	.1647	-33	-69
11 Arietis	5½	+0.84	+ 9.0	+19 29.9	7 56.7	+ 3 47.0	+1.2434	.5211	+1619	+90	+45
5 Arietis, mult.	4½	0.94	9.5	20 51.5	16 12.4	+11 47.4	+1.0177	.5255	.1481	+90	+27
64 Arietis	6	1.09	10.6	24 17.8	27 4 12.4	- 0 35.5	-1.1332	.5320	.1269	-28	-66
66 Arietis	6½	1.10	9.8	22 23.3	6 12.5	+ 1 20.8	+1.2210	.5331	.1225	+90	+48
7 Tauri	6	1.16	10.4	24 3.6	9 0.2	+ 4 3.0	-0.2872	.5347	.1170	+27	-41
9 Tauri	6	+1.17	+ 9.9	+22 48.7	10 12.9	+ 5 13.3	+1.2280	.5354	+1146	+90	+50
11 Tauri	6	1.21	10.7	24 56.4	11 56.9	+ 6 53.9	-0.9196	.5363	.1111	-11	-65
g Pleiadum	5½	1.24	10.3	23 54.6	13 51.2	+ 8 44.5	+0.4213	.5373	.1073	+70	- 3
h Pleiadum	4	1.24	10.2	23 44.1	13 53.4	+ 8 46.6	+0.6168	.5373	.1073	+82	+ 7
m Pleiadum	7	1.24	10.5	24 27.6	14 0.4	+ 8 53.3	.5374	.1070	+33	-34	
e Pleiadum	5	+1.24	+10.3	+24 5.3	14 2.1	+ 8 55.0	+0.2442	.5375	+1069	+58	-12
c Pleiadum	5	1.25	10.3	23 59.5	14 19.5	+ 9 11.9	+0.3831	.5376	.1064	+67	- 5
d Pleiadum	5	1.25	10.1	23 34.4	13 34.1	+ 9 25.9	+0.8688	.5377	.1058	+90	+22
7 Tauri	3	1.26	10.2	23 44.0	15 6.1	+ 9 56.9	+0.7496	.5380	.1047	+90	+15
f Pleiadum	4	1.27	10.1	23 41.1	15 52.9	+10 42.2	+0.8827	.5384	.1030	+90	+23
k Pleiadum	5½	+1.27	+10.1	+23 46.1	15 53.4	+10 42.4	+0.7916	.5384	+1029	+90	+18
B. A. C. 1192	6	1.28	10.6	25 12.9	16 23.0	+11 11.2	-0.7484	.5387	.1022	0	-65
p Tauri	6	1.41	10.7	26 10.1	28 1 46.7	- 3 44.0	-0.9272	.5437	.0820	-12	-64
z' Tauri	5½	1.50	10.1	25 20.7	7 6.6	+ 1 25.1	+0.3808	.5464	.0701	+67	- 1
z" Tauri	8½	+1.50	+10.1	+25 21.0	7 6.8	+ 1 25.2	+0.3762	.5464	+0.701	+67	- 2

March.

B. A. C. 1746	6½	+2.02	+ 8.3	+27 35.3	1 15 17.4	+ 8 28.1	+1.0261	.5591	-.0078	-21	-63
125 Tauri	6	2.03	7.4	25 49.8	16 58.5	+10 5.5	+0.8498	.5595	.0121	+90	+30
136 Tauri	5	2.14	7.4	27 35.0	22 45.9	+ 8 19.6	-1.1505	.5609	.0268	-33	-63
139 Tauri	5½	2.14	6.7	25 56.3	2 0 48.4	- 6 21.5	+0.5555	.5613	.0320	+82	+12
B. A. C. 2154	6½	2.37	4.0	24 41.3	17 39.9	+ 9 53.1	+0.9752	.5636	.0753	+90	+32
ε Geminorum	3½	+2.40	+ 3.8	+25 15.0	20 24.4	-11 28.5	+0.1621	.5637	-.0824	+53	-14
37 Geminorum	6	2.48	3.3	25 31.6	3 1 14.7	- 6 48.6	-0.5580	.5637	.0945	+11	-55
ω Geminorum	6	2.49	2.4	24 23.2	4 17.6	- 3 52.4	+0.3457	.5636	.1023	+64	- 6
48 Geminorum	6	2.54	1.7	24 19.8	8 34.2	+ 0 15.0	-0.0553	.5634	.1128	+40	-28
52 Geminorum	6	2.58	1.8	25 5.5	9 30.6	+ 1 9.3	-0.9640	.5633	.1151	-15	-65
58 Geminorum	6	+2.58	+ 0.6	+23 10.6	13 18.2	+ 4 48.6	+0.5948	.5630	-.1243	+85	+ 5
84 Geminorum	6½	2.70	- 1.4	22 38.8	1 50.2	- 6 58.0	-0.6167	.5612	.1538	+ 9	-64
7 Cancri	6½	2.73	2.2	22 24.6	6 39.6	- 2 27.7	-1.1120	.5604	.1643	-25	-68
μ Cancri	5½	2.73	2.6	21 56.0	8 21.7	- 0 49.3	-0.8993	.5601	.1680	- 9	-68
B. A. C. 2788	6	2.77	3.8	21 7.7	13 50.0	+ 4 27.3	-1.0151	.5590	.1805	-16	-69
d Cancri	6	2.74	4.6	18 43.1	15 11.6	+ 5 45.9	+1.2235	.5589	.1826	+90	+42
θ Cancri	6	+2.76	- 5.0	+18 30.1	18 47.0	+ 9 13.7	+0.7796	.5581	-.1895	+90	+ 8
B. A. C. 2854	6	2.77	4.9	19 23.6	18 48.3	+ 9 14.9	-0.1421	.5581	.1896	+35	-46
35 Cancri	6½	2.78	4.9	20 0.1	20 23.0	+10 46.3	-1.0691	.5578	.1926	-20	-70
δ Cancri	4	2.79	5.8	18 35.8	5 0 30.2	- 9 15.4	-0.4352	.5569	.2005	+19	-58
σ Cancri	6	2.78	7.4	15 47.0	6 4.0	- 5 53.3	+1.2969	.5556	.2107	+90	+47
σ Cancri	6	+2.78	- 7.3	+16 2.6	6 12.7	- 3 44.9	+1.0016	.5555	-.2110	+90	+20

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

March.

Star's—				At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. Δα' Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N'n.	S'n.
π <sup>1</sup> Cancri	6½	+2.81 - 8.6	+15 28.9	<sup>d</sup> 12 45.3	<sup>h</sup> 2 33.8	+0.1551	.5541	-.2220	+51°	-28°
π <sup>2</sup> Cancri	6	2.81 8.8	15 26.4	14 1.6	+ 3 47.5	-0.0875	.5538	.2241	+38 -41	
18 Leonis	6	2.83 11.2	12 21.9	<sup>6</sup> 3 57.6	- 6 45.4	-0.2386	.5511	.2441	+30 -52	
B. A. C. 3345	6	2.83 11.4	11 59.1	4 29.3	- 6 14.8	+0.0146	.5511	.2447	+43 -38	
A Leonis	5	2.83 12.6	10 35.2	13 39.0	+ 2 36.0	-0.8690	.5499	.2546	- 4 -60	
B. A. C. 3529	6	+2.80 -13.7	+ 7 2.1	19 22.6	+ 8 7.7	+1.2095	.5492	-.2607	+90 +29	
43 Leonis	6	2.80 13.8	7 9.2	20 29.4	+ 0 12.3	+0.8011	.5491	.2617	+90 + 1	
48 Leonis	6	2.81 14.4	7 34.3	<sup>7</sup> 1 49.1	- 9 39.0	-1.0235	.5488	.2645	-13 -83	
34 Sextantis	6	2.79 14.8	4 12.6	5 22.8	- 6 12.6	+1.3753	.5487	.2683	+90 +48	
35 Sextant. mult.	6	2.80 14.9	5 22.7	5 41.5	- 5 54.5	+0.1289	.5487	.2685	+50 -35	
d Leonis	5	+2.76 -15.7	+ 4 15.7	13 28.9	+ 1 36.9	-0.8686	.5488	-.2725	- 3 -86	
p <sup>1</sup> Leonis	6	2.74 16.0	2 36.5	16 22.8	+ 4 24.8	-0.0174	.5490	.2736	+42 -43	
p <sup>2</sup> Leonis	5	2.73 16.2	0 35.0	19 28.1	+ 7 23.8	+1.1424	.5492	.2743	+90 +22	
B. A. C. 3536	6	2.75 16.2	2 54.5	19 30.8	+ 7 26.4	-1.1730	.5493	.2744	-25 -87	
75 Leonis	5½	2.75 16.4	2 40.3	21 2.6	+ 8 55.1	-1.3580	.5494	.2747	-43 -88	
76 Leonis	6	+2.74 -16.4	+ 2 18.6	21 47.1	+ 9 38.0	-1.2034	.5494	-.2748	-26 -88	
v Leonis	4½	2.73 17.0	- 0 9.7	<sup>8</sup> 5 54.0	- 6 31.7	-0.9903	.5497	.2751	-11 -90	
B. A. C. 4201	6	2.67 17.5	8 0.6	<sup>9</sup> 4 34.0	- 8 39.0	+0.5876	.5560	.2665	+77 -12	
q Virginis	6	2.66 17.4	8 47.3	7 6.9	- 6 11.5	+0.6781	.5570	.2646	+81 - 7	
χ Virginis	5	2.67 17.5	7 20.1	9 30.3	- 3 53.1	-1.3874	.5579	.2627	-53 -90	
B. A. C. 4259	6	+2.67 -17.4	- 7 92.3	9 34.0	- 3 49.6	-1.3655	.5579	-.2626	-49 -90	
B. A. C. 4312	6½	2.65 17.2	9 41.1	14 45.6	+ 1 11.0	-0.4363	.5599	.2576	+18 -69	
69 Virginis	5½	2.59 16.3	15 21.1	<sup>10</sup> 6 8.7	- 7 59.2	+1.3320	.5665	.2383	+75 +45	
75 Virginis	6	2.57 16.3	14 44.8	8 25.4	- 5 47.6	+0.1952	.5675	.2349	+48 -31	
83 Virginis	6	2.55 16.0	15 34.5	13 16.8	- 1 7.0	-0.1067	.5698	.2271	+31 -49	
85 Virginis	6	+2.55 -16.0	-15 9.9	13 44.4	- 0 40.4	-0.6165	.5700	-.2264	+ 5 -84	
87 Virginis	6	2.56 15.5	17 16.5	14 28.7	+ 0 2.2	+1.2877	.5704	.2251	+73 +40	
89 Virginis	5	2.55 15.4	17 32.1	15 30.1	+ 1 1.4	+1.3314	.5708	.2233	+73 +47	
B. A. C. 4722	6	2.49 15.1	17 38.3	<sup>11</sup> 1 59.7	+11 7.2	-0.8063	.5759	.2036	- 9 -90	
B. A. C. 4739	6½	2.49 14.9	18 9.5	3 18.1	-11 37.4	-0.5566	.5765	.2008	+ 5 -79	
B. A. C. 4923	6	+2.40 -13.2	-20 52.2	18 47.4	+ 3 16.0	-0.7058	.5832	-.1658	- 7 -90	
B. A. C. 4984	6	2.39 12.0	23 31.5	23 42.7	+ 7 59.7	+1.1598	.5850	.1536	+67 +30	
B. A. C. 5023	6	2.25 12.2	21 57.3	<sup>12</sup> 2 18.0	+10 28.8	-0.8007	.5859	.1470	-15 -90	
42 Libræ	5½	2.30 11.0	23 25.6	11 36.7	- 4 34.7	-0.5826	.5887	.1121	- 5 -84	
B. A. C. 5197	6	2.30 10.3	24 20.2	13 45.5	- 2 31.1	+0.0766	.5892	.1163	+29 -38	
δ Scorpii	5	+2.28 -10.0	-25 23.1	15 43.7	- 0 37.6	+0.9097	.5897	-.1108	+65 +11	
Α <sup>2</sup> Scorpii, mult.	5	2.27 10.1	24 58.0	16 45.5	+ 0 21.7	+0.3767	.5899	.1079	+45 -22	
B. A. C. 5253	6	2.26 10.4	24 10.4	16 52.9	+ 0 28.8	-0.4366	.5899	.1077	+ 2 -71	
B. A. C. 5254	6	2.26 10.5	23 37.1	16 54.4	+ 0 30.2	-1.0002	.5900	.1076	-31 -90	
B. A. C. 5255	6	2.26 10.0	25 3.1	16 59.2	+ 0 34.8	+0.4380	.5900	.1073	+48 -18	
3 Scorpii	6	+2.26 -10.0	-24 53.3	17 9.8	+ 0 45.1	+0.2532	.5900	-.1068	+37 -29	
4 Scorpii	6	2.27 9.7	25 54.7	17 28.4	+ 1 2.9	+1.2529	.5900	.1060	+64 +46	
B. A. C. 5286	6½	2.25 10.0	24 29.0	18 41.3	+ 2 12.8	-0.3149	.5903	.1026	+ 7 -62	
π Scorpii	3	2.26 9.6	25 46.0	18 46.2	+ 2 17.5	+0.9725	.5903	.1023	+64 +16	
B. A. C. 5314	6	2.25 9.5	25 31.8	20 30.8	+ 3 57.9	+0.5601	.5906	.0973	+55 -11	
B. A. C. 5347	5	+2.23 - 9.1	-26 0.3	22 20.5	+ 5 43.2	+0.8664	.5908	-.0919	+64 + 8	
σ Scorpii	6½	2.18 8.9	25 18.2	<sup>13</sup> 3 24.1	+10 34.6	-0.2711	.5913	.0773	+ 7 -59	
α <sup>1</sup> Scorpii, mult.	1½	2.15 8.4	26 9.9	6 33.1	-10 24.0	+0.3736	.5914	.0680	+41 -22	
22 Scorpii	5	2.13 8.9	24 50.9	6 53.2	-10 4.7	-0.9842	.5914	.0671	-34 -90	
25 Scorpii	6	2.07 7.9	25 18.7	13 17.8	- 3 55.7	-0.8868	.5913	.0480	-29 -90	
B. A. C. 5800	6½	+1.99 - 6.4	-26 50.4	23 51.0	+ 6 12.1	+0.3311	.5894	-.0167	+34 -24	
Α <sup>1</sup> Ophiuchi	5½	1.97 6.4	26 25.5	<sup>14</sup> 0 19.2	+ 6 39.1	-0.1016	.5894	.0153	+10 -49	
Α <sup>2</sup> Ophiuchi	6	1.97 6.4	26 25.4	0 19.3	+ 6 39.2	-0.1027	.5894	.0153	+10 -49	
38 Ophiuchi	6½	1.96 6.4	26 29.8	1 11.3	+ 7 29.0	-0.0410	.5893	-.0128	+13 -45	
B. A. C. 5909	6½	+1.90 - 5.9	-26 10.7	6 40.8	-11 14.7	-0.3038	.5876	+0.034	- 6 -68	



**ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.**

**March.**

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
B. A. C. 6024	6 $\frac{1}{2}$	+1.82	-4.8	-27° 1.3	d h m 13 58.3	- 4 14.5	+0.5781	.5847	+0.246	+51°	-10°
B. A. C. 6194	6	1.69	3.7	27 5.2	15 1 0.2	+ 6 21.6	+1.0932	.5793	.0555	+63°	+27°
B. A. C. 6217	6 $\frac{1}{2}$	1.65	4.2	24 58.1	2 27.1	+ 7 45.1	-1.0233	.5785	.0594	-38°	-90°
$\lambda$ Sagittarii	3	1.62	3.8	25 29.3	5 3.2	+10 15.3	-0.3192	.5770	.0664	+ 4°	-63°
B. A. C. 6369	6	1.54	3.4	25 8.2	11 57.0	- 7 6.7	-0.1663	.5728	.0844	+13°	-53°
B. A. C. 6490	6 $\frac{1}{2}$	+1.45	-2.8	-25 0.9	19 17.2	- 0 3.0	+0.3949	.5685	+1.006	+46°	-21°
B. A. C. 6576	6	1.37	2.4	24 23.2	16 0 49.5	+ 5 17.1	+0.3419	.5639	.1157	+44°	-24°
B. A. C. 6607	6	1.33	2.9	22 37.7	3 2.6	+ 7 25.3	-1.2439	.5623	.1208	-52°	-90°
$\chi^1$ Sagittarii	6	1.33	1.9	24 44.5	4 59.1	+ 9 17.7	+1.2184	.5608	.1251	+66°	+39°
$\chi^2$ Sagittarii	6 $\frac{1}{2}$	1.33	1.9	24 39.0	5 2.0	+ 9 20.5	+1.1277	.5608	.1252	+66°	+28°
$\chi^3$ Sagittarii	6	+1.33	-2.1	-24 11.9	5 5.9	+ 9 24.2	+0.6699	.5608	+1.254	+64°	- 5°
B. A. C. 6699	6 $\frac{1}{2}$	1.26	2.0	23 34.3	9 30.6	-10 20.6	+0.5764	.5574	.1350	+60°	-11°
53 Sagittarii	6	1.24	1.8	23 41.9	11 20.3	- 8 34.8	+0.9609	.5559	.1388	+67°	+14°
B. A. C. 6727	6 $\frac{1}{2}$	1.24	1.7	23 42.2	11 27.9	- 8 27.5	+0.9826	.5558	.1391	+67°	+15°
B. A. C. 6889	6	1.11	1.5	21 39.3	22 34.9	+ 2 16.4	+0.4897	.5472	.1609	+57°	-16°
MARS				-21 11.3	17 2 42.8	+ 6 15.9	+0.6764	.5077	+1.674	+68°	- 6°
$\sigma$ Capricorni	5 $\frac{1}{2}$	+1.01	-1.6	19 29.7	5 13.6	+ 8 41.7	-0.6964	.5422	.1727	- 3°	-90°
$\pi$ Capricorni	5	0.99	1.6	18 36.4	8 55.3	-11 44.0	-0.9933	.5394	.1789	-22°	-90°
$\rho$ Capri., mult.	5	0.97	1.6	18 12.7	9 39.0	-11 1.8	-1.2835	.5389	.1801	-49°	-90°
B. A. C. 7053	5 $\frac{1}{2}$	0.97	1.3	18 59.1	10 6.5	-10 35.2	-0.3768	.5386	.1807	+13°	-66°
$\alpha$ Capri., mult.	5 $\frac{1}{2}$	+0.97	-1.3	-18 58.9	10 7.1	-10 34.6	-0.3788	.5386	+1.809	+13°	-66°
$\nu$ Capricorni	5 $\frac{1}{2}$	0.93	1.1	18 33.8	14 54.9	- 5 56.2	+0.0594	.5349	.1882	+37°	-39°
B. A. C. 7202	6	0.90	0.7	18 38.6	18 54.2	- 2 4.7	+0.9086	.5321	.1940	+72°	+ 8°
B. A. C. 7209	6 $\frac{1}{2}$	0.88	1.2	18 28.9	19 21.1	- 1 38.6	+0.8226	.5317	.1947	+72°	+ 3°
19 Capricorni	6	0.87	0.6	18 22.8	21 59.6	+ 0 54.9	+1.2331	.5299	.1983	+72°	+34°
B. A. C. 7263	6	+0.84	-1.0	-16 29.8	23 24.8	+ 2 17.4	-0.5016	.5289	+2.002	+ 9°	-74°
29 Capricorni	6	0.77	0.7	15 40.4	18 8 18.9	+10 54.7	-0.4458	.5231	.2140	+61°	-19°
18 Aquarii	6	0.72	1.0	13 23.7	12 34.3	- 8 57.7	-1.0993	.5205	.2159	-24°	-90°
B. A. C. 7487	6 $\frac{1}{2}$	0.67	0.4	14 1.2	17 40.1	- 4 1.2	+0.6885	.5175	.2211	+76°	- 6°
$\lambda$ Capricorni	5 $\frac{1}{2}$	0.64	0.5	11 55.4	23 58.6	+ 2 6.1	-0.1648	.5139	.2268	+30°	-52°
B. A. C. 7620	6	+0.61	-0.5	-10 52.8	19 3 39.3	+ 5 40.2	-0.4552	.5119	+2.297	+16°	-70°
B. A. C. 7697	6 $\frac{1}{2}$	0.57	0.2	11 2.2	10 49.9	-11 21.2	+1.3820	.5084	.2346	+79°	+52°
$\theta$ Aquarii	4 $\frac{1}{2}$	0.53	0.2	8 23.1	15 53.9	- 6 26.5	-0.3004	.5060	.2380	+25°	-60°
B. A. C. 7774	6	0.54	0.1	9 38.6	15 55.1	- 6 25.3	+1.0728	.5060	.2381	+18°	+81°
$\rho$ Aquarii	5 $\frac{1}{2}$	0.52	-0.1	- 8 25.7	17 41.9	- 4 41.5	+0.1751	.5054	.2389	+50°	-33°
$\eta$ Piscium	3 $\frac{1}{2}$	+0.34	+5.2	+14 43.4	24 2 20.7	+ 1 3.3	-0.4331	.5065	+2.095	+19°	-61°
101 Piscium	6	0.34	5.3	14 2.7	4 37.4	+ 3 16.1	+0.7960	.5075	.2070	+90°	+ 5°
105 Piscium	6	0.34	5.4	15 47.6	6 39.4	+ 5 14.5	-0.7286	.5083	.2048	+ 4°	-74°
3 Arietis	6 $\frac{1}{2}$	0.34	5.6	16 48.5	10 16.2	+ 8 45.1	-1.1238	.5096	.2007	-23°	-73°
4 Arietis	6	0.35	5.8	16 21.3	11 6.6	+ 9 34.1	-0.4533	.5100	.1998	+18°	-61°
$\iota$ Arietis	6	+0.37	+6.3	+17 13.7	15 52.4	- 9 48.5	-0.4870	.5119	+1.939	+16°	-62°
B. A. C. 632	6	0.39	6.5	17 40.5	19 9.4	- 6 37.3	-0.3527	.5133	.1896	+24°	-54°
15 Arietis	6	0.41	6.8	18 55.9	22 40.8	- 3 12.1	-1.0904	.5149	.1850	-22°	-71°
$\theta$ Arietis	5 $\frac{1}{2}$	0.44	7.0	19 20.6	25 2 30.3	+ 0 30.5	-0.8505	.5164	.1796	- 5°	-71°
26 Arietis	6	0.49	7.4	19 19.2	8 49.2	+ 6 37.9	+0.2797	.5197	.1703	+59°	-18°
$\mu$ Arietis	5 $\frac{1}{2}$	+0.54	+7.4	+19 29.8	14 40.6	-11 41.4	+1.0527	.5225	+1.611	+90°	+98°
$\epsilon$ Arietis, mult.	4 $\frac{1}{2}$	0.61	7.8	20 51.5	22 57.4	- 3 40.0	+0.8179	.5266	.1472	+90°	+14°
66 Arietis	6 $\frac{1}{2}$	0.76	8.2	22 23.3	26 13 1.0	+ 9 56.8	+1.0109	.5333	.1215	+90°	+30°
7 Tauri, mult.	6	0.80	8.6	24 3.6	15 49.7	-11 20.0	-0.5063	.5346	.1161	+14°	-54°
9 Tauri	6	0.81	8.3	22 48.7	17 2.9	-10 9.2	+1.0151	.5352	.1137	+90°	+31°
11 Tauri	6	+0.83	+9.0	+24 56.3	18 47.7	- 8 27.8	-1.1442	.5360	+1.102	-30°	-65°
$\gamma$ Pleiadum	5 $\frac{1}{2}$	0.85	8.5	23 54.6	20 42.8	- 6 36.4	+0.2026	.5368	.1064	+55°	-14°
$\delta$ Pleiadum	4	0.85	8.5	23 44.1	20 45.0	- 6 34.2	+0.4004	.5369	.1063	+68°	- 4°
$\epsilon$ Pleiadum	7	0.85	8.7	24 27.6	20 52.0	- 6 27.5	-0.3896	.5369	.1061	+21°	-46°
$\zeta$ Pleiadum	5	+0.85	+8.6	+24 5.3	20 53.8	- 6 25.7	+0.0240	.5369	+1.060	+44°	-23°

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

### March.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
<i>c</i> Pleiadum	5	+0.85 + 8.6	+23 59.4	<sup>d</sup> 21 11.3	- 6 8.8	+0.1635	.5371	+1.055	+52	-16
<i>d</i> Pleiadum	5	0.86 8.5	23 34.4	21 26.0	- 5 54.6	+0.6518	.5372	.1049	+90	+ 9
<i>e</i> Tauri	3	0.86 8.5	23 43.9	21 58.3	- 5 23.3	+0.5314	.5374	.1038	+79	+ 3
<i>f</i> Pleiadum	4	0.88 8.5	23 41.1	22 45.4	- 4 37.8	+0.6647	.5378	.1021	+90	+10
<i>A</i> Pleiadum	5½	0.88 8.5	23 46.1	22 46.0	- 4 37.2	+0.5731	.5378	.1021	+83	+ 5
B. A. C. 1192	6	+0.88 + 8.9	+25 12.8	23 15.8	- 4 8.4	-0.9752	.5380	+1.010	-16	-65
36 Tauri	6	0.96 8.4	23 46.5	<sup>27</sup> 5 49.0	+ 2 11.9	+1.2328	.5410	.0873	+90	+53
<i>p</i> Tauri	6	1.01 9.1	26 10.0	8 44.8	+ 5 1.8	-1.1617	.5422	.0810	-33	-64
$\chi^1$ Tauri	5½	1.08 8.7	25 20.7	14 8.4	+10 14.6	+0.1518	.5444	.0691	+52	-13
$\chi^2$ Tauri	8½	1.08 8.7	25 20.9	14 8.7	+10 14.9	+0.1469	.5444	+0.0691	+51	-13
125 Tauri	6	+1.53 + 7.2	+25 49.8	<sup>29</sup> 0 34.7	- 4 30.6	+0.6166	.5542	-0.0122	+89	+17
139 Tauri	5½	1.68 6.6	25 56.3	8 35.2	+ 3 13.1	+0.3200	.5555	.0318	+63	- 1
B. A. C. 2154	6½	1.89 4.6	24 41.3	<sup>30</sup> 1 52.5	- 5 6.4	+0.7471	.5559	.0741	+90	+18
<i>e</i> Geminorum	3½	1.95 4.4	25 15.0	4 41.5	- 1 23.4	-0.0748	.5559	.0794	+38	-26
B. A. C. 2238	6	1.97 3.3	23 44.7	8 15.8	+ 2 3.3	+1.2342	.5558	.0895	+90	+54
37 Geminorum	6	+2.03 + 3.8	+25 31.6	9 39.9	+ 3 24.4	-0.8019	.5557	-0.0929	- 4	-65
<i>u</i> Geminorum	6	2.04 3.1	24 23.2	12 48.1	+ 6 25.9	+0.1137	.5555	.1004	+49	-18
48 Geminorum	6	2.09 2.6	24 19.8	17 12.1	+10 40.7	-0.2898	.5552	.1107	+26	-40
52 Geminorum	6	2.12 2.7	25 5.5	18 10.2	+11 36.7	-1.2092	.5551	.1129	-38	-65
58 Geminorum	6	2.13 + 1.6	23 10.7	22 4.5	- 8 37.2	+0.3708	.5546	.1219	+66	- 7
84 Geminorum	6½	+2.30 - 0.4	+22 38.8	<sup>31</sup> 11 8.2	+ 3 59.0	-0.8470	.5526	-1.506	- 6	-68
$\mu^1$ Cancri	5½	2.37 1.5	21 56.0	17 42.2	+10 19.3	-1.1272	.5514	.1644	-26	-68
B. A. C. 2788	6	+2.42 - 2.4	+21 7.8	23 20.3	- 8 14.3	-1.2391	.5504	-1.757	-38	-69

### April.

<i>a</i> Cancri	6	+2.30 - 3.6	+18 43.1	<sup>1</sup> 0 44.4	- 6 53.2	+1.0306	.5501	-1.783	+90	+25
<i>o</i> Cancri	6	2.43 4.1	18 30.1	4 26.0	- 3 19.2	+0.5830	.5494	.1854	+82	- 3
B. A. C. 2854	6	2.45 3.8	19 23.5	4 27.3	- 3 18.0	-0.3490	.5494	.1855	+24	-51
35 Cancri	6½	2.48 3.8	20 0.1	6 4.7	- 1 44.0	-1.2856	.5492	.1885	-43	-70
<i>d</i> Cancri	4	2.49 4.7	18 35.8	10 19.0	+ 2 21.5	-0.6241	.5482	.1963	+ 9	-69
<i>o</i> Cancri	6	+2.49 - 6.4	+15 47.0	16 2.0	+ 7 52.9	+1.1200	.5474	-2.063	+90	+29
<i>o</i> Cancri	6	2.49 6.4	16 2.6	16 10.9	+ 8 1.4	+0.8218	.5474	.2071	+90	+ 9
$\pi^1$ Cancri	6½	2.55 7.5	15 28.9	22 53.8	- 9 29.4	-0.0243	.5464	.2174	+41	-37
$\pi^2$ Cancri	6	2.56 7.7	15 26.5	<sup>2</sup> 0 12.1	- 8 13.8	-0.2676	.5463	.2194	+28	-51
18 Leonis	6	2.64 10.6	12 21.9	14 27.4	+ 5 32.5	-0.3950	.5450	.2394	+22	-61
B. A. C. 3345	6	+2.63 -10.7	+11 59.1	14 59.8	+ 6 3.8	-0.1390	.5449	-2.401	+35	-46
B. A. C. 3398	6	2.63 11.8	9 30.1	19 5.5	+10 1.2	+1.3877	.5447	.2449	+90	+58
A Leonis	5	2.68 12.2	10 35.2	<sup>3</sup> 0 19.9	- 8 54.9	-1.0106	.5446	.2507	-12	-80
B. A. C. 3529	6	2.68 13.6	7 2.1	6 9.1	- 3 17.5	+1.0947	.5447	.2563	+90	+20
43 Leonis	6	2.69 13.6	7 9.2	7 16.9	- 2 12.0	+0.6858	.5447	.2573	+90	- 5
48 Leonis	6	+2.73 -14.3	+ 7 34.3	12 40.9	+ 3 1.1	-1.1371	.5451	-2.262	-22	-83
34 Sextantis	6	2.70 15.3	4 12.6	16 17.0	+ 6 29.9	+1.2817	.5454	.2644	+90	+35
35 Sext., mult.	6	2.72 15.1	5 22.7	16 35.9	+ 6 48.2	+0.0306	.5454	.2645	+44	-40
<i>d</i> Leonis	5	2.76 16.1	4 15.7	<sup>4</sup> 0 27.2	- 9 36.6	-0.9508	.5465	.2690	- 9	-86
<i>p</i> Leonis	6	2.75 16.4	2 36.5	3 22.1	- 6 47.6	-0.0903	.5471	.2703	+38	-47
<i>p</i> Leonis	5	+2.75 -16.9	+ 0 35.0	6 28.3	- 3 47.7	+1.0794	.5477	-2.714	+90	+17
B. A. C. 3836	6	2.78 16.6	2 54.5	6 31.0	- 3 45.1	-1.2399	.5477	.2714	-30	-87
76 Leonis	6	2.79 17.0	+ 2 18.5	8 47.7	- 1 33.1	-1.2636	.5483	.2720	-33	-88
<i>v</i> Leonis	4½	2.81 17.9	- 0 9.7	16 54.9	+ 6 17.4	-1.0273	.5509	.2720	-14	-90
B. A. C. 4201	6	2.88 19.6	8 0.7	<sup>5</sup> 15 25.2	+ 4 0.5	+0.6070	.5604	.2661	+78	-11
<i>q</i> Virginis	6	+2.89 -19.7	- 8 47.4	17 56.1	+ 6 26.0	+0.7041	.5621	-2.2636	+81	- 5
$\chi$ Virginis	5	2.89 19.7	7 20.1	20 17.7	+ 8 42.5	-1.3437	.5629	.2624	-45	-90
B. A. C. 4259	6	2.89 19.8	7 22.3	20 21.2	+ 8 45.9	-1.3219	.5630	.2623	-42	-90
B. A. C. 4312	6½	+2.91 -19.6	- 9 41.1	<sup>6</sup> 1 27.8	-10 18.6	-0.3838	.5656	-2.630	+20	-65

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

April.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$y'$	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
75 Virginis	6	+2.97	-19.3	-14 44.8	6 18 45.5	+ 6 20.6	+0.2857	.5756	-.2358	+52	-27
83 Virginis	6	2.98	19.0	15 34.6	23 29.5	+10 53.8	-0.0019	.5785	.2281	+36	-43
85 Virginis	6	2.98	19.0	15 10.0	23 56.4	+11 19.7	-0.5046	.5788	.2274	+10	-75
B. A. C. 4722	6	3.01	18.1	17 38.4	7 11 51.2	- 1 13.3	-0.6642	.5859	.2048	- 1	-90
B. A. C. 4739	6½	3.02	17.9	18 9.5	13 7.2	- 0 0.3	-0.4137	.5867	.2023	+12	-68
B. A. C. 4923	6	+3.03	-16.3	-20 52.3	8 4 7.0	- 9 36.4	-0.5321	.5947	-.1912	+ 2	-78
B. A. C. 5023	6	3.03	15.1	21 57.3	11 22.6	- 2 38.6	-0.6130	.5978	.1482	- 4	-96
42 Libræ	5½	3.02	13.8	23 25.6	20 22.1	+ 5 58.6	-0.3836	.6009	.1232	+ 5	-67
B. A. C. 5197	6	3.02	13.3	24 20.2	22 26.4	+ 7 57.7	+0.2681	.6015	.1170	+39	-27
$\delta$ Scorpii	5	3.04	12.8	25 23.1	9 0 20.6	+ 9 47.1	+1.0899	.6019	.1116	+65	+25
A <sup>2</sup> Scorpii, <i>mult.</i>	5	+3.03	-12.7	-24 58.1	1 20.1	+10 42.2	+0.5670	.6021	-.1087	+56	-11
B. A. C. 5253	6	3.01	13.0	24 10.5	1 27.3	+10 51.1	-0.2325	.6021	.1083	+12	-57
B. A. C. 5254	6	3.00	13.1	23 37.1	1 28.7	+10 52.4	-0.7863	.6021	.1083	-18	-90
B. A. C. 5255	6	3.02	12.7	25 3.2	1 33.3	+10 56.8	+0.6820	.6021	.1080	+60	- 7
3 Scorpii	6	3.02	12.7	24 53.3	1 43.6	+11 6.7	+0.4468	.6022	.1075	+49	-17
B. A. C. 5286	6½	+3.01	-12.6	-24 29.0	3 12.0	-11 28.6	-0.1100	.6024	-.1032	+18	-49
$\pi$ Scorpii	3	3.03	12.3	25 46.1	3 16.6	-11 24.2	+1.1558	.6025	.1030	+65	+33
B. A. C. 5314	6	3.02	11.9	25 31.9	4 57.7	- 9 47.3	+0.7520	.6028	.0978	+65	+ 1
B. A. C. 5347	5	3.01	11.6	26 0.3	6 43.6	- 8 5.9	+1.0568	.6030	.0925	+64	+23
$\sigma$ Scorpii	3½	2.98	11.0	25 18.2	11 36.6	- 3 25.1	-0.0556	.6033	.0777	+18	-46
$\alpha$ Scorpii, <i>mult.</i>	1½	+2.98	-10.3	-26 9.9	14 39.2	- 0 30.1	+0.5818	.6033	-.0691	+54	- 9
22 Scorpii	5	2.96	10.4	24 50.9	14 58.6	- 0 11.6	-0.7534	.6033	.0672	-20	-90
25 Scorpii	6	2.92	9.5	25 18.7	21 10.2	+ 5 44.4	-0.6496	.6032	.0479	-16	-90
B. A. C. 5709	6	2.87	8.8	24 54.7	10 2 4.1	+10 26.1	-1.2508	.6018	.0327	-61	-90
B. A. C. 5800	6½	2.86	7.3	26 50.4	7 22.7	- 8 28.5	+0.5575	.6004	.0163	+49	-10
A <sup>1</sup> Ophiuchi	5½	+2.84	- 7.3	-26 25.5	7 49.9	- 8 2.6	+0.1329	.6002	-.0148	+23	-35
A <sup>2</sup> Ophiuchi	6	2.84	7.3	26 25.5	7 50.0	- 8 2.5	+0.1318	.6002	.0148	+23	-35
38 Ophiuchi	6½	2.83	7.1	26 29.8	8 40.4	- 7 14.1	+0.1932	.6000	-.0122	+26	-31
B. A. C. 5909	6½	2.78	6.4	26 10.7	13 59.7	- 2 8.1	-0.1495	.5978	+0.042	+ 8	-52
B. A. C. 6024	6½	2.72	4.9	27 1.3	21 4.1	+ 4 39.0	+0.8130	.5943	.0254	+63	+ 5
B. A. C. 6217	6½	+2.54	- 3.8	-24 58.1	11 9 12.5	- 7 41.9	-0.7573	.5868	+0.0605	-20	-90
$\lambda$ Sagittarii	3	2.52	3.1	25 29.3	11 44.7	- 5 15.5	-0.0618	.5850	.0735	+17	-46
26 Sagittarii	6	2.43	2.8	23 56.7	17 18.4	+ 0 4.9	-1.2325	.5807	.0628	-55	-90
B. A. C. 6369	6	2.44	2.2	25 8.1	18 28.6	+ 1 12.4	+0.0913	.5799	.0654	+27	-37
B. A. C. 6490	6½	2.35	1.2	25 0.9	12 1 39.2	+ 8 6.5	+0.6483	.5740	.1037	+62	- 6
B. A. C. 6576	6	+2.28	- 0.6	-24 23.2	7 5.0	-10 39.9	+0.5977	.5693	+1.166	+60	- 9
B. A. C. 6607	6	2.20	1.0	22 37.7	9 15.6	- 8 34.1	-0.9703	.5674	.1216	-28	-90
$\chi^2$ Sagittarii	6	2.19	0.1	24 11.8	11 16.8	- 6 37.4	+0.9124	.5657	.1261	+66	+11
60 Sagittarii	6	2.16	- 0.8	22 1.2	11 40.4	- 6 14.6	-1.3044	.5653	.1270	-65	-90
B. A. C. 6699	6½	2.14	+ 0.3	23 34.3	15 37.1	- 2 26.6	+0.8310	.5619	.1355	+67	+ 5
53 Sagittarii	6	+2.12	+ 0.8	-23 41.9	17 25.0	- 0 42.6	+1.2126	.5602	+1.393	+67	+37
B. A. C. 6727	6½	2.12	0.8	23 42.1	17 32.5	- 0 35.4	+1.2342	.5601	.1395	+67	+40
B. A. C. 6889	6	1.95	1.3	21 39.2	13 4 30.4	+ 9 59.3	+0.7450	.5505	.1612	+67	- 1
$\sigma$ Capricorni	5½	1.82	1.3	19 29.6	11 4.8	- 7 39.7	-0.4345	.5447	.1787	+ 9	-70
$\pi$ Capricorni	5	1.78	1.3	18 36.4	14 44.6	- 4 7.3	-0.7311	.5414	.1787	- 6	-90
$\rho$ Capricorni	5	+1.75	+ 1.4	-18 12.7	15 27.9	- 3 25.5	-1.0200	.5408	+1.799	-24	-90
B. A. C. 7053	5½	1.77	1.7	18 59.1	15 55.2	- 2 59.1	-0.1192	.5403	.1805	+36	-49
$\circ$ Capri., <i>mult.</i>	5½	1.77	1.7	18 58.8	15 55.8	- 2 58.5	-0.1212	.5403	.1805	+36	-49
$\nu$ Capricorni	5½	1.70	2.1	18 33.7	20 41.4	+ 1 37.6	+0.3113	.5362	.1876	+50	-25
B. A. C. 7202	6	1.68	2.5	18 38.6	14 0 39.3	+ 5 27.8	+1.1540	.5329	.1933	+72	+27
B. A. C. 7209	6½	+1.67	+ 2.6	-18 28.8	1 6.0	+ 5 53.6	+1.0678	.5325	+1.939	+72	+20
B. A. C. 7263	6	1.58	2.2	16 29.7	5 8.5	+ 9 48.4	-0.2586	.5294	.1993	+22	-57
20 Capricorni	6	1.48	2.7	15 40.3	14 0.8	- 5 36.1	+0.6836	.5227	.2030	+74	- 6
18 Aquarii	6	1.40	2.3	13 23.6	18 15.7	- 1 29.0	-0.8610	.5199	.2144	- 9	-90
B. A. C. 7487	6½	+1.37	+ 2.9	-14 1.1	23 21.3	+ 3 27.4	+0.9164	.5165	+2.194	+76	+ 8

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

April.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
$\lambda$ Capricorni	5 $\frac{1}{2}$	+1.28	+ 2.8	-11 55.3	15 5 40.0	+ 9 34.9	+0.0567	.5127	+2248	+42	-39
B. A. C. 7620	6	1.24	2.7	10 52.7	9 21.0	-10 50.7	-0.2384	.5106	.2276	+27	-56
$\theta$ Aquarii	4 $\frac{1}{2}$	1.12	2.9	8 23.0	21 37.6	+ 1 4.6	-0.1024	.5044	.2278	+35	-48
B. A. C. 7774	6	1.12	3.0	9 38.5	21 38.9	+ 1 5.9	+1.2709	.5044	.2278	+81	-35
$\rho$ Aquarii	5 $\frac{1}{2}$	1.10	3.1	8 25.6	23 26.0	+ 2 49.9	+0.3701	.5037	.2362	+62	-23
$\kappa$ Aquarii	5	+0.99	+ 2.7	- 4 51.0	16 8 57.0	-11 55.2	-1.2621	.5001	+2403	-34	-90
B. A. C. 8152	6 $\frac{1}{2}$	0.79	3.2	- 0 22.4	17 10 10.7	-11 23.0	-0.0434	.4997	.2445	+40	-45
$\kappa$ Piscium	4 $\frac{1}{2}$	0.78	3.1	+ 0 35.7	12 4.8	- 9 32.1	-0.6403	.4991	.2444	+ 9	-84
9 Piscium	6	0.79	3.1	0 27.5	12 15.3	- 9 21.9	-0.4496	.4991	.2443	+19	-69
15 Piscium	6 $\frac{1}{2}$	0.75	3.2	0 38.7	16 51.0	- 4 53.7	+0.4641	.4944	.2440	+70	-18
16 Piscium	6	+0.74	+ 3.3	+ 1 25.9	17 21.9	- 4 23.6	-0.2791	.4943	+2439	+28	-58
$\lambda$ Piscium	5	0.72	3.2	1 6.9	20 31.2	- 1 19.5	+0.8404	.4943	.2434	+90	+ 2
19 Piscium	6	0.70	3.3	2 49.1	22 56.5	+ 1 1.9	-0.4500	.4942	.2430	+19	-69
B. A. C. 8276	6 $\frac{1}{2}$	0.70	3.5	1 32.7	18 0 17.1	+ 2 20.3	+1.2820	.4942	.2427	+90	+35
22 Piscium	6	0.69	3.5	2 15.6	2 2.6	+ 4 2.9	+0.9189	.4942	.2423	+90	+ 7
$\delta$ Piscium	5 $\frac{1}{2}$	+0.59	+ 3.5	+ 7 31.2	17 58.1	- 4 27.6	-1.0642	.4959	+2365	-18	-83
45 Piscium	6	0.58	3.7	7 1.4	20 47.3	- 1 43.0	+0.1309	.4964	.2352	+50	-34
66 Arietis	6 $\frac{1}{2}$	0.61	6.8	22 23.3	22 19 0.4	- 6 16.3	+0.8441	.5356	.1201	+90	+19
7 Tauri, mult.	6	0.63	7.0	24 3.5	21 48.9	- 3 33.3	-0.6810	.5369	.1147	+ 4	-65
9 Tauri	6	0.64	6.9	22 48.7	23 2.0	- 2 22.6	+0.8418	.5375	.1123	+90	+20
$\rho$ Pleiadum	5 $\frac{1}{2}$	+0.66	+ 7.0	+23 54.6	23 2 41.6	+ 1 9.9	+0.0209	.5389	+1057	+44	-23
$\epsilon$ Pleiadum	4	0.66	6.9	23 44.0	2 43.9	+ 1 12.1	+0.2196	.5392	.1049	+56	-13
$\mu$ Pleiadum	7	0.66	7.1	24 27.6	2 50.9	+ 1 18.8	-0.5727	.5292	.1046	+10	-58
$\sigma$ Pleiadum	5	0.66	7.0	24 5.3	2 52.7	+ 1 20.6	-0.1580	.5392	.1046	+33	-33
$\epsilon$ Pleiadum	5	0.67	7.0	23 59.4	3 10.2	+ 1 37.6	-0.0191	.5394	.1040	+41	-25
$\delta$ Pleiadum	5	+0.67	+ 6.9	+23 34.3	3 24.9	+ 1 51.7	+0.4700	.5394	+1039	+74	0
$\gamma$ Tauri	3	0.68	7.0	23 43.9	3 57.1	+ 2 22.9	+0.3483	.5392	.1023	+64	- 6
$f$ Pleiadum	4	0.68	7.0	23 41.0	4 44.2	+ 3 8.4	+0.4806	.5401	.1007	+75	+ 1
$\lambda$ Pleiadum	5 $\frac{1}{2}$	0.68	7.0	23 46.1	4 44.8	+ 3 9.0	+0.3904	.5401	.1006	+67	- 4
B. A. C. 1192	6	0.68	7.2	25 12.8	5 14.6	+ 3 37.8	-1.1636	.5404	.0992	-33	-65
36 Tauri	6	+0.72	+ 7.0	+23 46.5	11 47.8	+ 9 58.1	+1.0394	.5430	+0858	+90	+36
$\chi^1$ Tauri	5 $\frac{1}{2}$	0.80	7.2	25 20.6	20 7.6	- 5 58.8	-0.0571	.5459	.0678	+39	-24
$\chi^2$ Tauri	8 $\frac{1}{2}$	0.80	7.2	25 20.9	20 7.9	- 5 58.5	-0.0620	.5459	.0678	+39	-24
$\kappa$ Tauri	5 $\frac{1}{2}$	0.96	6.7	24 51.8	24 12 13.7	+ 9 34.4	+1.2671	.5506	+0309	+90	+63
118 Tauri	6	1.11	6.2	25 3.1	25 2 6.8	- 1 1.3	+1.2560	.5531	-.0022	+90	+63
125 Tauri	6	+1.16	+ 6.2	+25 49.8	6 44.5	+ 3 26.7	+0.3667	.5535	-.0134	+66	+ 3
139 Tauri	5 $\frac{1}{2}$	1.26	5.6	25 56.3	14 50.0	+11 15.3	+0.0604	.5536	.0327	+46	-14
B. A. C. 2154	6 $\frac{1}{2}$	1.46	3.9	24 41.3	26 8 21.6	+ 4 10.2	+0.4773	.5528	.0744	+74	+ 3
$\epsilon$ Geminorum	3 $\frac{1}{2}$	1.51	3.9	25 15.0	11 13.5	+ 6 56.2	-0.3528	.5524	.0818	+22	-41
B. A. C. 2238	6	1.53	3.1	23 44.7	14 51.6	+10 26.7	+0.9652	.5519	.0895	+90	+30
37 Geminorum	6	+1.58	+ 3.7	+25 31.6	16 17.3	+11 49.4	-1.0909	.5517	-.0928	-26	-65
$\omega$ Geminorum	6	1.60	3.1	24 23.2	19 29.1	- 9 5.5	-0.1685	.5512	.1000	+33	-33
48 Geminorum	6	1.65	2.6	24 19.8	23 58.5	- 4 45.3	-0.5789	.5504	.1100	+10	-58
58 Geminorum	6	1.70	1.8	23 10.7	27 4 57.3	+ 0 3.2	+0.0855	.5494	.1210	+48	-22
84 Geminorum	6 $\frac{1}{2}$	1.86	+ 0.2	22 38.8	18 20.0	-11 1.6	-1.1489	.5464	.1490	-29	-68
85 Geminorum	5 $\frac{1}{2}$	+1.83	- 0.7	+20 12.1	19 35.4	- 9 48.7	+1.2688	.5461	-.1516	+90	+51
$\delta^1$ Cancri	6	1.97	2.7	18 43.1	28 8 18.7	+ 2 28.7	+0.7531	.5430	.1756	+90	+ 8
$\theta$ Cancri	6	2.00	3.0	18 30.1	12 6.9	+ 6 9.3	+0.3003	.5419	.1825	+60	-17
B. A. C. 2854	6	2.02	2.8	19 23.6	12 8.2	+ 6 10.5	-0.6452	.5419	.1807	+ 7	-69
$\sigma$ Cancri	4	2.08	3.8	18 35.8	18 10.7	-11 59.0	-0.9376	.5406	.1929	-11	-72
$\delta^2$ Cancri	6	+2.10	- 5.4	+15 47.1	29 0 4.5	- 6 16.8	+0.8503	.5393	-.2025	+90	+10
$\alpha^2$ Cancri	6	2.10	5.3	16 2.6	0 13.7	- 6 8.0	+0.5476	.5392	.2027	+78	- 7
$\pi^1$ Cancri	6 $\frac{1}{2}$	2.17	6.2	15 28.9	7 9.6	+ 0 34.2	-0.3067	.5378	.2131	+26	-53
$\pi^2$ Cancri	6	2.18	6.6	15 26.5	8 30.4	+ 1 52.3	-0.5527	.5376	.2151	+13	-68
18 Leonis	6	+2.20	- 9.2	+12 21.9	23 14.2	- 7 52.7	-0.6683	.5359	-.2342	+ 7	-77

**ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.**

**April.**

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	$\alpha'$	$\gamma'$	<i>N</i> n.	<i>S</i> n.
B. A. C. 3345	6	+2.29 - 9.5	+11° 59.1	<sup>d h m</sup> 29 23 47.7	<sup>h m</sup> - 7 20.3	-0.4075	.5359	-.2348	+21°	-63°
B. A. C. 3398	6	2.30 10.8	9 30.1	30 4 1.6	- 3 14.8	+1.1476	.5356	.2396	+90	+26
A Leonis	5	2.38 10.9	10 35.2	9 26.5	+ 1 59.6	-1.2794	.5355	.2451	-36	-80
B. A. C. 3529	6	2.40 12.7	7 2.1	15 27.3	+ 7 48.7	+0.8664	.5357	.2506	+90	+ 5
43 Leonis	6	2.41 12.8	7 9.2	16 37.2	+ 8 56.3	+0.4532	.5358	.2516	+70	-18
48 Leonis	6	+2.46 -13.1	+ 7 34.3	22 11.5	- 9 40.3	-1.3874	.5363	-.2559	-52	-83

**May.**

34 Sextantis	6	+2.47 -14.5	+ 4 12.6	<sup>d h m</sup> 1 1 54.4	<sup>h m</sup> - 6 4.6	+1.0740	.5367	-.2583	+90	+18
35 Sext., mult.	6	2.48 14.2	5 22.7	2 13.9	- 5 45.8	-0.1944	.5368	.2586	+32	-52
$\delta$ Leonis	5	2.54 15.4	4 15.7	10 19.5	+ 2 3.8	-1.1735	.5385	.2630	-25	-86
$\rho^2$ Leonis	6	2.56 16.0	2 36.5	13 19.5	+ 4 57.9	-0.2939	.5392	.2642	+27	-59
$\rho^3$ Leonis	5	2.57 16.8	+ 0 35.0	16 30.8	+ 8 3.0	+0.8989	.5402	.2653	+90	+ 6
$\nu$ Leonis	4½	+2.67 -17.2	- 0 9.7	2 3 13.8	- 5 35.5	-1.2084	.5440	-.2671	-28	-90
B. A. C. 4201	6½	2.86 20.4	8 0.7	3 2 11.4	- 7 25.1	+0.5048	.5559	.2610	+71	-16
$\eta$ Virginis	6	2.89 20.6	8 47.4	4 44.6	- 4 57.3	+0.6088	.5574	.2593	+78	-10
B. A. C. 4312	6½	2.96 20.8	9 41.1	12 22.1	+ 2 24.0	-0.4639	.5624	.2533	+16	-70
69 Virginis	6	3.10 21.2	15 21.1	4 3 33.0	- 6 58.7	+1.3756	.5733	.2358	+75	+63
75 Virginis	6	+3.12 -21.0	-14 44.8	5 46.9	- 4 49.8	+0.2598	.5750	-.2326	+51	-28
83 Virginis	6	3.17 20.8	15 34.6	10 31.5	- 0 15.9	-0.0144	.5782	.2257	+35	-43
85 Virginis	6	3.17 20.8	15 10.0	10 58.3	+ 0 9.8	-0.5162	.5789	.2245	+ 9	-75
B. A. C. 4722	6	3.27 20.0	17 38.4	22 51.3	+11 35.1	-0.6397	.5880	.2026	0	-87
B. A. C. 4739	6½	3.29 19.9	18 9.6	5 0 6.9	-11 12.3	-0.3867	.5890	.2001	+13	-67
B. A. C. 4923	6	+3.42 -18.2	-20 52.3	14 58.3	+ 3 3.0	-0.4624	.5993	-.1659	+ 5	-72
B. A. C. 5023	6	3.47 17.1	21 57.4	22 7.7	+ 9 54.7	-0.5229	.6034	.1470	0	-77
42 Libræ	5½	3.53 15.7	23 25.6	6 57.9	- 5 37.4	-0.2724	.6076	.1220	+11	-59
B. A. C. 5197	6	3.58 15.1	24 20.2	8 59.8	- 3 40.7	+0.3782	.6085	.1161	+45	-21
$\delta$ Scorpii	5	3.60 14.6	25 23.2	10 51.6	- 1 53.7	+1.1973	.6091	.1104	+65	+37
A <sup>1</sup> Scorpii	5	+3.60 -14.5	-24 58.1	11 50.0	- 0 57.7	+0.6811	.6095	-.1075	+64	- 4
B. A. C. 5253	6	3.59 14.6	24 10.5	11 57.1	- 0 50.9	-0.1105	.6095	.1071	+18	-49
B. A. C. 5254	6	3.58 14.7	23 37.1	11 58.4	- 0 49.7	-0.6590	.6095	.1071	-11	-90
B. A. C. 5255	6	3.60 14.5	25 3.2	12 2.9	- 0 45.4	+0.7416	.6095	.1068	+65	0
3 Scorpii	6	3.60 14.4	24 53.4	12 13.0	- 0 35.7	+0.5622	.6096	.1063	+56	-10
B. A. C. 5286	6½	+3.59 -14.2	-24 29.1	13 39.5	+ 0 47.1	+0.0145	.6101	-.1020	+24	-42
$\pi$ Scorpii	3	3.61 14.0	25 46.1	13 44.0	+ 0 51.4	+1.2688	.6101	.1017	+65	+51
B. A. C. 5314	6	3.62 13.7	25 31.9	15 22.9	+ 2 26.1	+0.8722	.6105	.0968	+65	+ 9
B. A. C. 5347	5	3.62 13.5	26 0.3	17 6.4	+ 4 5.2	+1.1771	.6110	.0914	+64	+35
$\sigma$ Scorpii	3½	3.62 12.6	25 18.2	21 52.7	+ 8 39.1	+0.0870	.6119	.0765	+86	-37
$\alpha$ Scorpii, mult.	1½	+3.63 -11.8	-26 9.9	7 0 50.8	+11 29.5	+0.7236	.6121	-.0669	+64	- 1
22 Scorpii	5	3.61 12.0	24 51.0	1 9.8	+11 47.7	-0.5956	.6122	.0623	-11	-86
25 Scorpii	6	3.61 10.8	25 18.7	7 11.8	- 6 25.9	-0.4797	.6121	.0467	- 7	-75
B. A. C. 5641	6½	3.59 10.5	24 37.6	8 50.5	- 4 51.4	-1.2306	.6119	.0414	-58	-90
B. A. C. 5709	6	3.58 9.7	24 54.7	11 57.8	- 1 52.2	-1.0627	.6116	.0312	-43	-90
26 Ophiuchi	6	+3.58 - 9.8	-24 48.5	12 2.1	- 1 48.1	-1.1690	.6115	-.0310	-52	-90
B. A. C. 5800	6½	3.62 8.2	26 50.4	17 7.6	+ 3 4.3	+0.7321	.6104	.0146	+63	0
A <sup>1</sup> Ophiuchi	5	3.60 8.2	26 25.5	17 34.0	+ 3 29.5	+0.3137	.6104	.0132	+33	-24
A <sup>2</sup> Ophiuchi	6	3.60 8.2	26 25.5	17 34.1	+ 3 29.6	+0.3126	.6104	.0132	+33	-24
38 Ophiuchi	6½	3.60 8.0	26 29.8	18 23.0	+ 4 16.5	+0.3743	.6101	.0106	+36	-21
$\theta$ Ophiuchi	3½	+3.56 - 8.2	-24 52.8	20 0.4	+ 5 49.7	-1.2474	.6097	-.0053	-62	-90
B. A. C. 5909	6½	3.57 7.1	26 10.7	23 33.1	+ 9 13.3	+0.0465	.6083	+0.062	+17	-39
B. A. C. 6024	6½	3.56 5.3	27 1.3	8 24.9	- 8 12.2	+1.0072	.6051	.0277	+63	+20
63 Ophiuchi	6½	3.46 5.1	24 51.9	8 9.3	- 6 32.2	-1.0998	.6042	.0330	-46	-90
B. A. C. 6217	6½	3.40 2.9	24 58.0	18 11.0	+ 3 4.5	-0.5202	.5976	.0629	- 7	-78
$\lambda$ Sagittarii	3	+3.41 - 2.3	-25 29.3	20 38.4	+ 5 25.8	+0.1687	.5955	+0.0701	+30	-32

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

May.

STAR'S—					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
24 Sagittarii	6	+3.35	-2.1	-24 7.2	8 22 56.6	+7 38.4	-1.0450	.5937	+.0765	-38	-90
26 Sagittarii	6	3.32	1.5	23 56.7	9 2 1.9	+10 36.3	-0.9754	.5912	.0651	-32	-90
B. A. C. 6369	6	3.35	1.0	25 8.1	3 9.9	+11 41.6	+0.3297	.5903	.0682	+40	-24
B. A. C. 6448	6	3.21	-0.6	23 19.5	7 35.9	-8 3.0	-1.0932	.5865	.0999	+40	-90
B. A. C. 6490	6½	3.24	+0.5	25 0.9	10 7.4	-5 37.5	+0.8880	.5842	.1066	+65	+10
B. A. C. 6524	6½	+3.17	+0.0	-22 40.9	11 58.3	-3 50.9	-1.2900	.5825	+.1112	-62	-90
B. A. C. 6576	6	3.16	1.4	24 23.1	15 23.3	-0 33.8	+0.8445	.5794	.1195	+66	+6
B. A. C. 6607	6	3.10	1.1	22 37.6	17 30.0	+1 28.0	-0.6974	.5775	.1246	-11	-90
3 Sagittarii	6	3.11	2.1	24 11.8	19 27.6	+3 21.1	+1.1604	.5755	.1292	+66	+32
60 Sagittarii	6	3.06	1.4	22 1.2	19 50.5	+3 43.1	-1.0238	.5751	.1301	-31	-90
B. A. C. 6671	6	+3.03	+1.6	-21 33.7	21 44.3	+5 32.6	-1.2442	.5733	+.1343	-51	-90
B. A. C. 6699	6½	3.07	2.6	23 34.2	23 40.2	+7 24.2	+1.0649	.5713	.1386	+67	+24
B. A. C. 6889	6	2.86	4.2	21 39.2	10 12 11.9	-4 31.5	+1.0127	.5587	.1641	+69	+17
Capricorni	5½	2.74	4.5	19 29.6	18 35.9	+1 39.0	-0.1451	.5523	.1755	+24	-51
Capricorni	5	2.66	4.8	18 36.3	22 10.0	+5 5.8	-0.4360	.5488	.1813	+10	-70
Capricorni	5	+2.66	+4.8	-18 12.6	22 52.2	+5 46.5	-0.7204	.5481	+.1824	-5	-90
B. A. C. 7043	6½	2.65	4.6	17 49.9	22 55.8	+5 50.0	-1.1064	.5480	.1825	-30	-90
B. A. C. 7053	5½	2.66	5.0	18 59.0	23 18.8	+6 12.2	+0.1685	.5476	.1831	+41	-33
Capri., mult.	5½	2.66	5.0	18 58.8	23 19.4	+6 12.8	+0.1664	.5476	.1831	+41	-33
Capricorni	5½	2.60	5.6	18 33.7	11 3 58.1	+10 41.9	+0.5965	.5432	.1902	+67	-10
B. A. C. 7209	6½	+2.53	+6.2	-18 28.8	8 15.6	-9 8.1	+1.3468	.5392	+.1963	+72	+56
B. A. C. 7263	6	2.45	6.0	16 29.7	12 13.6	-5 18.8	+0.0425	.5355	.2014	+37	-40
29 Capricorni	6	2.32	6.6	15 40.3	20 55.0	+3 5.8	+0.9703	.5280	.2116	+75	+12
18 Aquarii	6	2.26	6.5	13 23.6	12 1 5.1	+7 8.0	-0.5571	.5247	.2159	+9	-78
B. A. C. 7487	6½	2.20	7.3	14 1.1	6 5.1	+11 58.7	+1.2006	.5211	.2206	+76	+29
Capricorni	5	+2.10	+7.1	-11 55.3	12 17.7	-6 0.0	+0.3491	.5167	+.2257	+59	-24
B. A. C. 7620	6	2.05	7.1	10 52.7	15 55.3	-2 28.9	+0.0551	.5141	.2233	+42	-39
Aquarii	4½	1.89	7.4	8 23.0	12 4 2.3	+9 16.4	+0.1832	.5070	.2354	+60	-32
B. A. C. 7774	6	1.88	7.4	8 38.4	4 3.5	+9 18.0	+0.4664	.5070	.2354	+69	-18
Aquarii	5½	1.88	7.6	8 25.5	5 49.5	+11 0.9	+0.6509	.5061	.2363	+81	-8
Aquarii	5	+1.74	+7.1	-4 51.0	15 14.8	-3 49.9	-0.9790	.5017	+.2398	-12	-90
B. A. C. 8152	6½	1.48	7.2	-0 22.3	14 16 19.1	-3 27.3	+0.2004	.4947	.2428	+54	-32
Piscium	4½	1.46	7.1	+0 35.7	18 12.7	-1 36.9	-0.4017	.4945	.2427	+21	-66
9 Piscium	6	1.45	7.2	0 27.6	18 23.4	-1 26.4	-0.2103	.4945	.2426	+31	-54
15 Piscium	6½	1.41	7.4	0 38.8	22 57.8	+3 0.5	+0.6948	.4990	.2417	+90	-6
16 Piscium	6	+1.41	+7.1	+1 26.0	23 28.6	+3 30.5	-0.0452	.4968	+.2418	+40	-45
Piscium	5	1.38	7.4	1 7.0	15 2 37.4	+6 34.2	+1.0651	.4939	.2415	+90	+17
19 Piscium	6	1.35	7.0	2 49.0	5 2.3	+8 55.2	-0.2252	.4939	.2410	+30	-55
22 Piscium	6	1.32	7.4	2 15.6	8 8.2	+11 56.0	+1.1353	.4939	.2403	+90	+22
Piscium	5½	1.17	6.7	7 31.2	16 0 2.8	+3 24.6	-0.8958	.4954	.2342	-5	-83
45 Piscium	6	+1.16	+7.0	+7 1.4	2 52.0	+6 9.1	+0.3119	.4958	+.2329	+60	-25
75 Piscium	6	1.01	6.5	12 19.6	17 1 12.3	+3 52.4	-0.5086	.5016	.2175	+15	-68
Piscium	3½	0.95	6.4	14 43.4	14 30.9	-7 11.6	-0.3761	.5071	.2050	+22	-57
101 Piscium	6	0.94	6.5	14 2.6	16 47.5	-4 58.9	+0.8435	.5081	.2027	+90	+9
105 Piscium	6	0.93	6.2	15 47.6	19 49.5	-3 0.5	-0.6918	.5091	.2004	+5	-75
3 Arietis	6½	+0.91	+6.3	+16 48.4	22 26.9	+0 30.7	-1.1048	.5107	+.1964	-22	-73
4 Arietis	6	0.91	6.3	16 21.3	23 16.4	+1 18.8	-0.4366	.5111	.1954	+19	-60
Arietis	6	0.90	6.2	17 13.7	18 4 1.3	+5 55.2	-0.4925	.5135	.1897	+16	-62
B. A. C. 632	6	0.89	6.2	17 40.4	7 17.9	+9 6.0	-0.3730	.5151	.1856	+22	-54
15 Arietis	6	0.86	6.2	18 55.8	10 48.7	-11 29.4	-1.1272	.5180	.1782	-25	-71
Arietis	5½	+0.86	+6.2	+19 20.6	14 37.7	-7 47.3	-0.9063	.5189	+.1756	-9	-71
125 Tauri	6	1.09	5.2	25 49.7	22 12 25.4	+10 55.0	+0.2178	.5560	-.0150	+56	-3
139 Tauri	5½	1.15	4.7	25 56.3	20 29.3	-5 18.1	-0.1023	.5562	.0345	+36	-23
5 Geminorum	6	1.17	4.2	24 26.8	22 2 30.7	+0 30.8	+1.2782	.5560	.0489	+90	+65
B. A. C. 2154	6½	+1.26	+3.3	+24 41.4	13 59.6	+11 35.5	+0.2863	.5546	-.0761	+60	-7

**ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.**

**May.**

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\alpha$ Geminorum	3 $\frac{1}{2}$	+1.29   + 3.3	+25 15.0	<sup>d</sup> 23 16 51.4	<sup>h</sup> 9 38.6	-0.5495	.5541	-.0827	+11	-5
B. A. C. 2238	6	1.30   2.8	23 44.6	20 29.9	- 6 7.7	+0.7676	.5534	.0010	+90	+18
Venus			25 4.0	24 1 5.2	- 1 41.9	-1.1089	.6033	.0969	-27	-65
$\omega$ Geminorum	6	1.36   2.5	24 23.2	1 7.9	- 1 39.3	-0.3753	.5522	.1014	-21	-45
44 Geminorum	6 $\frac{1}{2}$	1.35   2.0	22 49.0	2 28.0	- 0 21.9	+1.1844	.5519	.1044	+90	+47
48 Geminorum	6	+1.40   + 2.1	+24 19.8	5 38.1	+ 2 41.7	-0.8078	.5510	-.1113	- 4	-66
$\delta$ Geminorum	3 $\frac{1}{2}$	1.40   1.4	22 12.2	9 8.9	+ 6 5.2	+1.0988	.5501	.1190	+90	+37
58 Geminorum	6	1.43   1.5	23 10.7	10 38.2	+ 7 31.5	-0.1308	.5497	.1222	+35	-33
63 Geminorum	5 $\frac{1}{2}$	1.44   + 1.0	21 41.5	12 36.3	+ 9 25.5	+1.2249	.5492	.1264	+90	+49
85 Geminorum	5 $\frac{1}{2}$	1.54   - 0.5	20 12.1	25 1 22.2	- 2 14.5	+1.0414	.5451	.1522	+90	+29
$\delta^1$ Cancri	6	+1.63   - 2.1	+18 43.1	14 13.6	+10 11.1	+0.5113	.5405	-.1757	+75	- 6
$\theta$ Cancri	6	1.67   2.6	18 30.1	18 4.8	-10 6.3	+0.0526	.5392	.1823	+45	-30
B. A. C. 2854	6	1.68   2.4	19 23.6	18 6.2	-10 4.0	-0.8999	.5392	.1823	- 8	-71
$\delta$ Cancri	4	1.73   3.1	18 35.8	26 0 13.9	+ 4 8.3	-1.1989	.5372	.1922	-32	-72
54 Cancri	6 $\frac{1}{2}$	1.73   4.2	15 47.6	3 17.2	- 1 11.0	+1.1773	.5363	.1969	+90	+34
$\alpha^1$ Cancri	6	+1.76   - 4.6	+15 47.1	6 13.6	+ 1 39.7	+0.6002	.5354	-.2014	+83	- 4
$\alpha^2$ Cancri	6	1.77   4.5	16 2.6	6 22.9	+ 1 48.6	+0.2949	.5353	.2016	+59	-20
$\pi^1$ Cancri	6 $\frac{1}{2}$	1.84   5.4	15 28.9	13 26.6	+ 8 38.7	-0.5700	.5333	.2114	+12	-69
$\pi^2$ Cancri	6	1.85   5.5	15 26.5	14 49.0	+ 9 58.4	-0.8200	.5330	.2135	- 2	-75
$\xi$ Leonis	6	1.88   7.4	11 50.0	22 54.4	- 6 11.8	+1.2028	.5312	.2237	+90	+33
18 Leonis	6	+1.98   - 8.0	+12 21.9	27 5 52.4	+ 0 33.0	-0.9404	.5299	-.2315	- 9	-78
B. A. C. 3345	6	1.98   8.1	11 59.2	6 26.7	+ 1 6.2	-0.6764	.5298	.2322	+ 6	-78
B. A. C. 3398	6	1.98   9.4	9 30.1	10 47.0	+ 5 18.2	+0.8944	.5293	.2366	+90	+ 9
B. A. C. 3407	6	1.99   9.7	8 53.2	11 36.3	+ 6 6.1	+1.3437	.5292	.2374	+90	+47
$\pi$ Leonis	5	1.99   9.9	8 37.3	12 37.5	+ 7 5.2	+1.3782	.5291	.2384	+90	+54
B. A. C. 3529	6	+2.09   -11.4	+ 7 2.2	22 31.1	- 7 19.9	+0.6179	.5285	-.2468	+83	- 9
43 Leonis	6	2.10   11.4	7 9.2	23 43.1	- 6 10.2	+0.2001	.5285	.2477	+53	-30
34 Sextantis	6	2.17   13.3	4 12.6	28 9 16.9	+ 3 5.5	+0.8360	.5288	.2538	+90	+ 3
35 Sext., <i>mult.</i>	6	2.18   12.9	6 22.7	9 36.9	+ 3 24.8	-0.4511	.5289	.2540	+19	-68
$\rho^1$ Leonis	6	2.28   14.6	2 36.5	21 3.5	- 9 30.4	-0.5424	.5305	.2589	+14	-76
$\rho^2$ Leonis	5	+2.31   -15.5	+ 0 35.0	29 0 21.1	- 6 19.0	+0.6722	.5313	-.2599	+88	- 7
B. A. C. 4006	6	2.48   18.3	- 4 40.0	18 5.0	+10 50.5	+1.3715	.5300	.2679	+86	+47
B. A. C. 4201	6	2.68   19.8	8 0.7	30 11 8.6	+ 3 20.0	+0.3247	.5465	.2549	+59	-25
$\gamma$ Virginis	6	2.72   20.0	8 47.4	13 46.7	+ 5 52.7	+0.4359	.5481	.2533	+66	-20
B. A. C. 4312	6 $\frac{1}{2}$	2.82   20.3	9 41.1	21 38.5	-10 31.9	-0.6382	.5534	.2474	+ 6	-85
69 Virginis	5 $\frac{1}{2}$	+3.06   -21.5	-15 21.1	31 13 15.8	+ 4 32.3	+1.2618	.5655	-.2305	+75	+37
75 Virginis	6	3.08   21.1	14 44.8	15 33.4	+ 6 44.8	+0.1348	.5674	.2274	+44	-35
83 Virginis	6	3.15   21.1	15 34.5	20 25.3	+11 25.9	-0.1315	.5713	.2202	+29	-50
85 Virginis	6	3.16   21.0	15 9.9	20 52.8	+11 52.4	-0.6394	.5716	.2196	+ 2	-87
87 Virginis	6	3.18   21.3	17 15.6	21 37.0	-11 25.1	+1.2735	.5723	.2184	+73	+39
89 Virginis	5	+3.20   -21.7	-17 32.2	22 38.3	-10 26.1	+1.3259	.5732	-.2168	+73	+48

**June.**

B. A. C. 4722	6	+3.34   -20.6	-17 38.5	1 9 2.1	- 0 26.0	-0.7326	.5819	-.1983	- 6	-90
B. A. C. 4739	6 $\frac{1}{2}$	3.37   20.5	18 9.6	10 19.3	+ 0 48.0	-0.4738	.5831	.1957	+ 8	-72
B. A. C. 4923	6	3.58   19.1	20 52.4	2 1 26.3	- 8 40.8	-0.5124	.5951	.1624	+ 3	-76
B. A. C. 5023	6	3.71   18.0	21 57.4	8 41.1	- 1 43.7	-0.5560	.6002	.1439	- 2	-80
42 Libræ	5 $\frac{1}{2}$	3.84   16.6	23 25.7	17 36.2	+ 6 49.2	-0.2828	.6059	.1193	+10	-59
B. A. C. 5197	6	+3.87   -16.2	-24 20.3	19 38.9	+ 8 46.6	+0.3761	.6070	-.1134	+45	-21
$\delta$ Scorpii	5	3.90   16.1	25 23.2	21 31.5	+10 34.4	+1.2009	.6081	.1080	+65	+38
$\Lambda^1$ Scorpii	5	3.90   15.9	24 58.1	22 30.1	+11 30.5	+0.6852	.6085	.1051	+64	- 3
B. A. C. 5253	6	3.89   15.8	24 10.5	22 37.3	+11 37.5	-0.1091	.6086	.1047	+18	-49
B. A. C. 5254	6	3.88   15.7	23 37.2	22 38.6	+11 38.7	-0.6579	.6086	.1047	-11	-90
B. A. C. 5255	6	+3.90   -15.9	-25 3.2	22 43.2	+11 43.1	+0.7462	.6086	-.1044	+65	+ 1

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

June.

STAR'S—				AT CONJUNCTION IN R. A.							Limiting Parallels	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N'n.	S'n.	
		$\Delta\alpha$	$\Delta\delta$		$d\ h\ m$	$h\ m$						
3 Scorpii	6	+3.91	-15.8	-24° 53.4	22 53.4	+11 52.8	+0.5670	.6087	-.1039	+56	-10	
B. A. C. 5286	64	3.91	15.4	24 29.6	0 20.3	-10 43.9	+0.0293	.6093	.0996	+24	-40	
$\pi$ Scorpii	3	3.92	15.5	25 46.1	0 24.8	-10 39.6	+1.2779	.6093	.0993	+65	+54	
B. A. C. 5314	6	3.95	15.2	25 31.9	2 4.0	-9 4.6	+0.8841	.6100	.0944	+65	+10	
B. A. C. 5347	5	3.97	14.8	26 0.3	3 48.0	-7 25.0	+1.1929	.6106	.0892	+64	+38	
$\sigma$ Scorpii	34	+4.01	-13.4	-25 18.3	8 34.7	-2 50.6	+0.1120	.6122	-.0743	+27	-36	
$\alpha$ Scorp., mult.	14	4.05	12.8	26 9.9	11 32.9	-0 0.2	+0.7549	.6130	.0648	+64	+2	
22 Scorpii	5	4.02	12.7	24 51.0	11 51.8	+0 18.0	-0.5633	.6130	.0639	-9	-82	
25 Scorpii	6	4.06	11.3	25 18.7	17 53.2	+6 3.8	-0.4346	.6138	.0445	-4	-71	
B. A. C. 5641	64	4.05	11.0	24 37.6	19 31.7	+7 38.1	-1.1820	.6139	.0392	-53	-90	
B. A. C. 5709	6	+4.08	-10.1	-24 54.7	22 38.2	+10 36.5	-1.0076	.6139	-.0292	-39	-90	
26 Ophiuchi	6	4.08	10.1	24 48.3	22 42.3	+10 40.4	-1.1140	.6139	.0290	-47	-90	
B. A. C. 5800	64	4.14	8.9	26 50.4	4 3 45.8	-8 29.3	+0.7958	.6136	.0127	+63	+5	
A <sup>1</sup> Ophiuchi	54	4.14	8.8	26 25.5	4 12.2	-8 4.1	+0.3797	.6134	.0111	+37	-21	
A <sup>2</sup> Ophiuchi	6	4.14	8.8	26 25.7	4 12.3	-8 4.0	+0.3786	.6134	.0111	+37	-21	
38 Ophiuchi	64	+4.14	-8.7	-26 29.7	5 0.8	-7 17.5	+0.4415	.6133	-.0085	+41	-17	
$\theta$ Ophiuchi	34	4.10	8.2	24 52.7	6 37.5	-5 45.0	-1.1719	.6130	-.0033	-54	-90	
B. A. C. 5909	64	4.14	7.1	26 10.6	10 8.1	-2 23.5	+0.1250	.6121	+0.081	+22	-35	
B. A. C. 6024	64	4.16	5.0	27 1.3	16 55.4	+4 6.3	+1.0952	.6097	.0298	+63	+28	
63 Ophiuchi	64	4.10	4.9	24 51.8	18 38.4	+5 45.0	-0.9998	.6090	.0351	-38	-90	
B. A. C. 6217	64	+4.09	-2.3	-24 58.3	5 4 31.5	-8 46.9	-0.2964	.6036	+0.655	0	-68	
$\lambda$ Sagittarii	3	4.09	1.8	25 29.2	6 56.2	-6 28.2	+0.2872	.6020	.0725	+36	-26	
24 Sagittarii	6	4.04	1.0	24 7.2	9 12.1	-4 17.9	-0.9124	.6004	.0791	-29	-90	
26 Sagittarii	6	4.03	-0.3	23 56.7	12 14.2	-1 23.2	-0.8375	.5982	.0877	-23	-90	
B. A. C. 6369	6	4.05	+0.3	25 8.1	13 20.9	-0 19.3	+0.4586	.5973	.0909	+48	-16	
B. A. C. 6448	6	+3.97	+1.1	-23 19.4	17 41.8	+3 51.0	-0.9439	.5938	+1.028	-28	-90	
B. A. C. 6485	64	3.95	1.7	22 51.7	19 53.1	+5 57.0	-1.1795	.5919	.1086	-46	-90	
B. A. C. 6490	64	4.01	1.8	25 0.8	20 10.2	+6 13.5	+1.0238	.5918	.1094	+65	+20	
B. A. C. 6524	64	3.93	2.0	22 40.8	21 58.8	+7 57.7	-1.1171	.5901	.1140	-41	-90	
B. A. C. 6576	6	3.96	2.9	24 23.0	6 1 19.5	+11 10.5	+0.9874	.5870	.1228	+66	+17	
B. A. C. 6607	6	+3.89	+3.1	-22 37.6	3 23.4	-10 50.5	-0.5345	.5852	+1.277	-2	-79	
50 Sagittarii	6	3.85	3.9	22 0.8	5 40.8	-8 38.5	-0.8582	.5830	.1332	-20	-90	
B. A. C. 6671	6	3.81	4.0	21 33.7	7 32.0	-6 51.6	-1.0678	.5811	.1375	-34	-90	
B. A. C. 6699	64	3.86	4.9	23 34.2	9 25.2	-5 2.7	+1.2397	.5793	.1419	+67	+41	
B. A. C. 6889	6	3.71	7.0	21 39.1	21 38.9	+6 43.5	+1.1855	.5669	.1676	+69	+33	
$\sigma$ Capricorni	54	+3.59	+7.8	-19 29.6	7 3 53.2	-11 15.8	+0.0506	.5606	+1.781	+34	-39	
$\pi$ Capricorni	5	3.53	8.4	18 36.3	7 21.9	-7 54.5	-0.2319	.5571	.1850	+21	-56	
$\rho$ Capricorni	5	3.50	8.5	18 12.6	8 3.1	-7 14.7	-0.5124	.5564	.1862	+6	-75	
B. A. C. 7043	64	3.50	8.4	17 49.8	8 6.6	-7 11.3	-0.8931	.5564	.1863	-16	-90	
B. A. C. 7053	64	3.51	8.7	18 58.9	8 29.0	-6 49.8	+0.3651	.5560	.1869	+53	-22	
$\sigma$ Capri., mult.	54	+3.51	+8.7	-18 58.7	8 29.6	-6 49.2	+0.3645	.5560	+1.869	+53	-22	
B. A. C. 7097	6	3.44	8.5	16 56.3	11 1.5	-4 22.5	-1.2677	.5534	.1909	-46	-90	
$\nu$ Capricorni	54	3.46	9.4	18 33.6	13 1.1	-2 27.1	+0.7055	.5514	.1939	+72	+2	
B. A. C. 7145	64	3.40	8.9	16 33.1	13 16.7	-2 12.0	-1.2368	.5512	.1943	-41	-90	
B. A. C. 7263	6	3.33	10.2	16 29.6	21 3.9	+5 19.2	+0.2575	.5437	.2052	+49	-28	
29 Capricorni	6	+3.22	+11.4	-15 40.2	8 5 32.0	-10 29.3	+1.1809	.5358	+2.153	+75	+28	
18 Aquarii	6	3.12	11.2	13 23.5	9 35.8	-6 33.4	-0.3236	.5323	.2196	+21	-61	
$\lambda$ Capricorni	54	2.98	12.2	11 55.2	20 32.0	+4 2.1	+0.5793	.5234	.2200	+73	-12	
B. A. C. 7620	6	2.93	12.3	10 52.6	9 0 4.5	+7 28.1	+0.2898	.5207	.2316	+55	-27	
$\theta$ Aquarii	44	2.76	12.5	8 22.9	11 55.2	-5 2.6	+0.4223	.5129	.2322	+65	-20	
$\rho$ Aquarii	54	+2.75	+12.8	-8 25.5	13 40.0	-3 20.9	+0.8857	.5118	+2.389	+82	+5	
$\kappa$ Aquarii	5	2.60	12.4	4 50.9	22 53.8	+5 36.8	-0.7268	.5069	.2421	+3	-90	
B. A. C. 8152	64	2.31	12.6	-0 22.2	10 23 32.9	+5 34.1	-0.4358	.4980	.2440	+68	-20	
$\kappa$ Piscium	44	2.30	12.4	+0 35.8	11 1 24.8	+7 22.9	-0.1622	.4976	.2437	+34	-51	
9 Piscium	6	+2.29	+12.5	+0 27.7	1 35.2	+7 33.0	+0.0269	.4976	+2.437	+44	-41	



ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

June.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
15 Piscium	6 $\frac{1}{2}$	+2.25 +12.7	+0 38.9	11 6 6.3	+11 56.6	+0.9237	.4968	+2429	+90	+7
16 Piscium	6	2.24 12.4	1 26.1	6 36.7	-11 33.9	+0.1886	.4967	.2428	+53	-32
2 Piscium	5	2.21 12.6	1 7.1	9 43.2	-8 32.5	+1.2885	.4963	.2420	+90	+36
19 Piscium	6	2.18 12.1	2 49.1	12 6.4	-6 13.2	+0.0061	.4961	.2413	+42	-42
22 Piscium	6	2.16 12.4	2 15.7	15 10.2	-3 14.5	+1.3549	.4958	.2404	+90	+45
36 Piscium	6	+2.01 +11.2	+7 34.3	12 4 43.2	+9 56.2	-1.2503	.4959	+2348	-32	-83
d Piscium	5 $\frac{1}{2}$	2.00 11.3	7 31.3	6 56.0	-11 54.6	-0.6771	.4961	.2337	+6	-83
45 Piscium	6	1.98 11.5	7 1.5	9 44.0	-9 11.3	+0.5207	.4964	.2321	+74	-14
75 Piscium	6	1.78 10.4	12 18.6	12 57.0	-11 35.4	-0.3234	.5015	.2163	+25	-56
$\eta$ Piscium	3 $\frac{1}{2}$	1.68 9.8	14 43.5	21 13.2	+1 18.2	-0.2104	.5064	.2035	+31	-48
101 Piscium	6	+1.67 +9.9	+14 2.7	23 29.5	+3 30.6	+1.0023	.5074	+2011	+90	+19
105 Piscium	6	1.66 9.9	15 47.6	14 1 31.2	+5 28.7	-0.5315	.5083	.1968	+14	-66
3 Arietis	6 $\frac{1}{2}$	1.63 9.3	16 48.5	5 7.2	+8 58.5	-0.9488	.5099	.1947	-11	-73
4 Arietis	6	1.63 9.5	16 21.4	5 57.5	+9 47.2	-0.2639	.5103	.1938	+27	-51
$\epsilon$ Arietis	6	1.60 9.2	17 13.7	10 42.0	-9 36.6	-0.3470	.5125	.1881	+23	-53
B. A. C. 632	6	+1.58 +9.1	+17 40.4	13 58.3	-6 26.1	-0.2327	.5142	+1839	+29	-46
15 Arietis	6	1.57 8.8	18 55.8	17 28.8	-3 1.8	-0.9906	.5160	.1792	-13	-71
$\theta$ Arietis	5 $\frac{1}{2}$	1.54 8.6	19 20.6	21 17.2	+0 39.7	-0.7764	.5180	.1740	-1	-71
26 Arietis	6	1.50 8.5	19 19.2	15 3 34.2	+6 45.3	+0.3142	.5215	.1648	+61	-15
$\mu$ Arietis	5 $\frac{1}{2}$	1.46 8.5	19 29.8	9 23.5	-11 36.1	+1.0508	.5248	.1559	+90	+29
$\epsilon$ Arietis	4 $\frac{1}{2}$	+1.43 +7.9	+20 51.4	17 36.8	-3 38.2	+0.7672	.5295	+1421	+90	+12
66 Arietis	6 $\frac{1}{2}$	1.39 7.5	22 23.3	16 7 34.0	+9 52.2	+0.8832	.5372	.1167	+90	+22
7 Tauri	6	1.38 7.1	24 3.5	10 21.4	-11 25.9	-0.6506	.5387	.1112	+5	-63
9 Tauri	6	1.38 7.3	22 48.7	11 34.0	-10 15.7	+0.8624	.5393	.1088	+90	+21
$g$ Pleiadum	5 $\frac{1}{2}$	1.37 7.0	23 54.5	15 11.9	-6 44.9	+0.0307	.5412	.1015	+44	-23
$h$ Pleiadum	4	+1.37 +7.0	+23 44.0	15 14.1	-6 42.8	+0.2287	.5412	+1015	+56	-13
$m$ Pleiadum	7	1.37 6.9	24 27.6	15 21.2	-6 35.9	-0.5616	.5413	.1012	+11	-57
$e$ Pleiadum	5	1.37 7.0	24 5.3	15 22.9	-6 34.2	-0.1483	.5413	.1011	+34	-32
$c$ Pleiadum	5	1.37 7.0	23 59.4	15 40.3	-6 17.5	-0.0110	.5415	.1006	+42	-25
$d$ Pleiadum	5	1.36 7.1	23 34.3	15 54.8	-6 3.4	+0.4754	.5416	.1000	+74	+1
$\gamma$ Tauri	3	+1.36 +7.0	+23 43.9	16 26.8	-5 32.5	+0.3522	.5418	+0989	+64	-6
$f$ Pleiadum	4	1.36 7.0	23 41.0	17 13.6	-4 47.2	+0.4812	.5422	.0974	+75	+1
$k$ Pleiadum	5 $\frac{1}{2}$	1.36 7.0	23 46.0	17 14.1	-4 46.7	+0.3902	.5422	.0974	+67	-4
B. A. C. 1192	6	1.37 6.7	25 12.8	17 43.7	-4 18.1	-1.1596	.5425	.0964	-33	-65
36 Tauri	6	1.34 6.7	23 46.4	17 0 13.5	+1 58.8	+1.0116	.5456	.0827	+90	+34
$\chi^1$ Tauri	5 $\frac{1}{2}$	+1.34 +6.1	+25 20.6	8 28.6	+9 57.1	-0.1107	.5493	+0646	+36	-26
$\chi^2$ Tauri	8 $\frac{1}{2}$	1.34 6.1	25 20.9	8 28.9	+9 57.3	-0.1156	.5493	+0646	+35	-27
$\delta$ Geminorum	3 $\frac{1}{2}$	1.42 1.0	22 12.2	20 15 0.5	-10 15.8	+1.0116	.5538	-1211	+90	+30
63 Geminorum	5 $\frac{1}{2}$	1.44 +0.7	21 41.5	18 26.0	-6 57.4	+1.1334	.5527	.1224	+90	+39
85 Geminorum	5 $\frac{1}{2}$	1.48 -0.7	20 12.1	21 7 5.2	+5 15.8	+0.9337	.5484	.1541	+90	+21
$\delta^1$ Cancri	6	+1.54 -2.1	+18 43.1	19 50.7	-6 24.5	+0.3921	.5435	-1778	+66	-12
$\theta$ Cancri	6	1.56 2.5	18 30.1	23 40.4	-2 42.4	-0.0699	.5420	.1842	+38	-37
B. A. C. 2854	6	1.57 2.3	19 23.6	23 41.8	-2 41.1	-1.0214	.5420	.1843	-17	-71
$\delta$ Cancri	4	1.61 3.0	18 35.8	22 5 47.5	+3 12.7	-1.3271	.5398	.1942	-51	-72
54 Cancri	6 $\frac{1}{2}$	1.58 3.9	15 47.8	8 49.9	+6 9.1	+1.0414	.5387	.1988	+90	+23
$\alpha^1$ Cancri	6	+1.60 -4.1	+15 47.1	11 45.6	+8 59.1	+0.4655	.5376	-2031	+71	-11
$\alpha^2$ Cancri	6	1.61 4.0	16 2.6	11 55.0	+9 8.1	+0.1601	.5376	.2034	+51	-27
$\eta^1$ Cancri	6 $\frac{1}{2}$	1.63 4.8	15 28.9	18 57.4	-8 3.1	-0.7110	.5351	.2130	+3	-75
$\eta^2$ Cancri	6	1.66 5.0	15 26.5	20 19.8	-6 43.4	-0.9620	.5346	.2148	-12	-75
$\xi$ Leonis	6	1.64 6.6	11 50.0	23 4 24.9	+1 6.2	+1.0568	.5323	.2246	+90	+21
18 Leonis	6	+1.75 -7.1	+12 21.9	11 23.4	+7 51.3	-1.0950	.5304	-2321	-20	-78
B. A. C. 3345	6	1.75 7.2	11 59.2	11 57.7	+8 24.5	-0.8312	.5302	.2327	-3	-78
B. A. C. 3398	6	1.76 8.3	9 30.2	16 19.0	-11 22.4	+0.7444	.5291	.2370	+90	0
B. A. C. 3407	6	1.75 8.4	8 53.3	17 8.5	-10 34.4	+1.1921	.5289	.2377	+90	+30
$\pi$ Leonis	5	+1.76 -8.6	+8 37.3	18 9.9	-9 35.0	+1.2260	.5287	-2386	+90	+33

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

### June.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha'$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N'n.	S'n.
B. A. C. 3529	6	+1.83 - 9.9	+ 7 2.2	<sup>d h m</sup> 24 4 7.1	<sup>h m</sup> + 0 3.5	+0.4597	.5271	-.2465	+70°	0°
43 Leonis	6	1.85 10.0	7 9.2	5 19.6	+ 1 13.7	+0.0393	.5270	.2473	+44	-39
34 Sextantis	6	1.90 11.6	4 12.7	14 58.8	+10 34.8	+0.6770	.5266	.2528	+49	- 6
35 Sextantis	6	1.91 11.2	5 22.7	15 19.2	+10 54.6	-0.6184	.5266	.2530	+10	-80
$\rho^3$ Leonis	6	2.00 13.0	2 36.5	25 2 54.7	- 1 51.8	-0.7119	.5272	.2572	+ 5	-87
$\rho^3$ Leonis	5	+2.03 -13.8	+ 0 35.1	6 15.1	+ 1 22.4	+0.5139	.5276	-.2580	+74	-15
B. A. C. 4006	6	2.21 16.5	- 4 39.9	26 0 19.5	- 5 7.5	+1.2266	.5318	.2578	+86	+30
B. A. C. 4201	6	2.44 18.4	8 0.7	17 47.9	+11 46.9	+0.1781	.5391	.2509	+50	-33
$\eta$ Virginis	6	2.47 18.6	8 47.4	20 30.2	- 9 36.2	+0.2928	.5404	.2493	+57	-27
B. A. C. 4312	6	2.60 19.0	9 41.1	27 4 35.2	- 1 47.4	-0.7808	.5452	.2432	- 2	-90
69 Virginis	5	+2.86 -20.5	-15 21.1	20 40.5	-10 15.4	-0.1519	.5562	-.2258	+75	+26
75 Virginis	6	2.89 20.3	14 44.8	23 2.3	- 7 58.6	+0.0112	.5580	.2227	+37	-42
83 Virginis	6	2.98 20.3	15 34.5	28 4 3.3	- 3 8.4	-0.2542	.5618	.2156	+22	-57
85 Virginis	6	2.98 20.1	15 9.9	4 31.7	- 2 41.0	-0.7693	.5622	.2149	- 5	-90
87 Virginis	6	3.01 20.8	17 15.5	5 17.3	- 1 57.1	+1.1735	.5628	.2137	+73	+28
89 Virginis	5	+3.03 -20.8	-17 32.2	6 20.5	- 0 56.1	+1.2280	.5636	-.2121	+73	+34
B. A. C. 4722	6	3.20 20.1	17 38.5	17 4.1	+ 9 23.7	-0.8496	.5722	.1939	-13	-90
B. A. C. 4739	6	3.23 20.1	18 9.6	18 23.6	+10 40.3	-0.5851	.5732	.1914	+ 2	-82
B. A. C. 4923	6	3.53 19.2	20 52.4	29 9 58.7	+ 1 39.5	-0.6052	.5856	.1586	- 3	-85
B. A. C. 4984	6	3.65 19.1	23 31.7	14 52.4	+ 6 21.6	+1.2981	.5895	.1470	+67	+54
B. A. C. 5023	6	+3.67 -18.4	-21 57.4	17 26.4	+ 8 49.5	-0.6400	.5911	-.1405	- 6	-89
49 Libra	5	3.84 17.1	23 25.7	20 2 36.6	- 6 22.6	-0.3508	.5971	.1165	+ 7	-64
B. A. C. 5197	6	3.90 16.9	24 20.3	4 42.5	- 4 21.9	+0.3193	.5984	.1107	+41	-24
$\delta$ Scorpii	5	3.94 16.8	25 23.3	6 38.1	- 2 31.1	+1.1566	.5995	.1053	+65	+33
A <sup>3</sup> Scorpii	5	3.99 16.3	24 58.1	7 38.3	- 1 33.3	+0.6359	.6000	.1024	+61	- 6
B. A. C. 5253	6	+3.97 -16.2	-24 10.5	7 45.6	- 1 26.3	-0.1685	.6001	-.1021	+14	-52
B. A. C. 5254	6	3.95 16.1	23 37.2	7 47.0	- 1 25.0	-0.7239	.6001	.1020	-15	-90
B. A. C. 5255	6	3.99 16.3	25 3.2	7 51.7	- 1 20.5	+0.6979	.6001	.1018	+64	- 2
3 Scorpii	6	3.99 16.3	24 53.4	8 2.1	- 1 10.5	+0.5168	.6002	.1013	+53	-13
B. A. C. 5286	6	4.00 15.9	24 29.6	9 31.3	+ 0 50.0	-0.0258	.6011	.0970	+22	-44
$\pi$ Scorpii	3	+4.03 -16.1	-25 46.1	9 35.9	+ 0 19.4	+1.2392	.6011	-.0968	+64	+44
B. A. C. 5314	6	4.05 15.8	25 31.9	11 17.6	+ 1 56.9	+0.8414	.6019	.0918	+65	+ 7
B. A. C. 5347	5	4.09 15.4	26 0.3	13 4.1	+ 3 39.0	+1.1558	.6028	.0867	+64	+33
$\sigma$ Scorpii	3	4.13 14.2	25 18.3	17 57.7	+ 8 20.3	+0.0684	.6049	.0721	+24	-38
$\alpha$ Scorpii	1	4.20 13.7	26 9.9	20 59.8	+11 14.7	+0.7221	.6060	.0629	+64	0
22 Scorpii	5	+4.16 -13.4	-24 51.0	21 19.1	+11 33.2	-0.6102	.6061	-.0619	-12	-88

### July.

25 Scorpii	6	+4.25 -12.1	-25 18.7	<sup>d h m</sup> 1 3 28.1	<sup>h m</sup> - 4 33.3	-0.4715	.6078	-.0429	- 6	-74
B. A. C. 5641	6	4.25 11.4	24 37.6	5 8.6	- 4 57.1	-1.2238	.6081	.0375	-57	-90
B. A. C. 5709	6	4.32 10.5	24 54.7	8 18.6	- 1 55.1	-1.0433	.6085	.0277	-42	-90
26 Ophiuchi	6	4.33 10.5	24 48.4	8 22.8	- 1 51.1	-1.1505	.6085	.0275	-50	-90
B. A. C. 5800	6	4.42 9.3	26 50.4	13 31.6	+ 3 4.6	+0.7821	.6086	.0112	+63	+ 4
A <sup>1</sup> Ophiuchi	5	+4.42 - 9.2	-26 25.5	13 58.4	+ 3 30.2	+0.3631	.6086	-.0098	+36	-21
A <sup>2</sup> Ophiuchi	6	4.42 9.2	26 25.7	13 58.4	+ 3 30.2	+0.3620	.6086	.0098	+36	-21
38 Ophiuchi	6	4.43 9.1	26 29.8	14 47.7	+ 4 17.5	+0.4265	.6 86	.0072	+40	-18
$\theta$ Ophiuchi	3	4.39 8.4	24 52.7	16 26.0	+ 5 51.5	-1.1976	.6083	-.0020	-57	-90
B. A. C. 5909	6	4.46 7.6	26 10.6	19 59.7	+ 9 16.2	+0.1137	.6080	+0.0093	+21	-36
B. A. C. 6024	6	+4.53 - 5.8	-27 1.3	2 2 52.2	- 8 8.8	+1.0975	.6065	+0.0308	+63	+28
63 Ophiuchi	6	4.48 5.1	24 51.8	4 36.3	- 6 29.0	-1.0067	.6061	.0363	-39	-90
B. A. C. 6217	6	4.52 2.1	24 53.3	14 34.7	+ 3 4.3	-0.3877	.6019	.0663	0	-67
$\lambda$ Sagittarii	3	4.52 1.5	25 29.2	17 0.2	+ 5 23.8	+0.3012	.6005	.0735	+37	-25
24 Sagittarii	6	4.50 0.8	24 7.2	19 16.8	+ 7 34.8	-0.8995	.5993	.0800	-27	-90
B. A. C. 6343	6	+4.49 - 0.3	-23 36.4	21 3.2	+ 9 16.9	-1.2709	.5982	+0.0852	-61	-90

**ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.**

**July.**

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.		
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
26 Sagittarii	6	+4.50	0.0	-23 56.7	$\begin{smallmatrix} d & h & m \\ 22 & 19.7 & +10 & 30.2 \end{smallmatrix}$	-0.8204	.5975	+0.0889	-22°	-90°	
B. A. C. 6369	6	4.54	+ 0.3	25 8.1	23 26.7	+11 34.5	+0.4809	.5962	.0920	+50	-15
B. A. C. 6448	6	4.49	1.6	23 19.4	$\begin{smallmatrix} 3 & 3 & 48.2 \\ & - & 8 & 14.5 \end{smallmatrix}$	-0.9196	.5940	.1040	-27	-90	
B. A. C. 6485	6 $\frac{1}{2}$	4.47	2.2	22 51.7	5 59.7	- 6 8.3	-1.1527	.5925	.1099	-44	-90
B. A. C. 6490	6 $\frac{1}{2}$	4.54	2.3	25 0.8	6 16.7	- 5 51.9	+1.0541	.5922	.1106	+65	+23
B. A. C. 6524	6 $\frac{1}{2}$	+4.45	+ 2.9	-22 40.8	8 5.4	- 4 7.6	-1.1013	.5909	+1.154	-39	-90
B. A. C. 6576	6	4.50	4.1	24 23.0	11 25.9	- 0 55.1	+1.0233	.5881	.1240	+66	+20
B. A. C. 6607	6	4.45	4.5	22 37.6	13 29.6	+ 1 3.8	-0.4974	.5865	.1291	0	-75
50 Sagittarii	6	4.42	5.0	22 0.8	15 46.6	+ 3 15.4	-0.8183	.5846	.1348	-17	-90
B. A. C. 6671	6	4.40	5.4	21 33.7	17 37.5	+ 5 2.0	-1.0257	.5829	.1392	-30	-90
B. A. C. 6699	6 $\frac{1}{2}$	+4.45	+ 6.0	-23 34.2	19 30.2	+ 6 50.4	+1.2823	.5813	+1.434	+67	+49
B. A. C. 6889	6	4.33	9.0	21 39.1	$\begin{smallmatrix} 4 & 7 & 39.2 \\ & - & 5 & 28.1 \end{smallmatrix}$	+ 5 28.1	+1.2394	.5702	.1697	+69	+39
$\sigma$ Capricorni	5 $\frac{1}{2}$	4.25	10.3	19 29.5	13 50.0	+ 0 29.1	+0.1146	.5645	.1813	+38	-36
$\pi$ Capricorni	5	4.20	10.9	18 36.2	17 16.5	+ 3 48.2	-0.1643	.5613	.1874	+24	-52
$\rho$ Capricorni	5	4.19	11.0	18 12.6	17 57.1	+ 4 27.4	-0.4426	.5606	.1886	+10	-70
B. A. C. 7043	6 $\frac{1}{2}$	+4.18	+10.9	-17 49.8	18 0.7	+ 4 30.8	-0.8218	.5606	+1.887	-11	-90
B. A. C. 7053	5 $\frac{1}{2}$	4.19	11.1	18 58.8	18 22.8	+ 4 52.2	+0.4315	.5603	.1893	+57	-19
$\alpha$ Capricorni	5 $\frac{1}{2}$	4.19	11.1	18 58.7	18 23.4	+ 4 52.8	+0.4309	.5603	.1893	+57	-19
B. A. C. 7097	6	4.14	11.5	16 56.3	20 53.5	+ 7 17.4	-1.1915	.5579	.1934	-37	-90
$\nu$ Capricorni	5 $\frac{1}{2}$	4.17	12.0	18 33.6	22 51.6	+ 9 11.5	+0.8638	.5560	.1965	+72	+6
B. A. C. 7145	6 $\frac{1}{2}$	+4.11	+11.9	-16 33.0	23 7.0	+ 9 26.2	-1.1580	.5558	+1.969	-33	-90
B. A. C. 7263	6	4.07	13.2	16 29.6	$\begin{smallmatrix} 5 & 6 & 47.5 \\ & - & 7 & 8.8 \end{smallmatrix}$	- 7 8.8	+0.3355	.5487	.2079	+53	-24
29 Capricorni	6	3.95	14.8	15 40.1	15 7.9	+ 0 54.5	+1.2607	.5413	.2182	+75	+37
18 Aquarii	6	3.89	15.1	13 23.5	19 7.7	+ 4 46.5	-0.2315	.5379	.2224	+25	-55
$\lambda$ Capricorni	5 $\frac{1}{2}$	3.77	16.4	11 55.1	$\begin{smallmatrix} 6 & 5 & 52.2 \\ & - & 8 & 49.7 \end{smallmatrix}$	- 8 49.7	+0.6725	.5293	.2321	+72	-7
B. A. C. 7620	6	+3.72	+16.5	-10 52.5	9 20.8	- 5 27.6	+0.3878	.5266	+2.248	+61	-22
$\theta$ Aquarii	4 $\frac{1}{2}$	3.58	17.5	8 22.8	20 57.9	+ 5 48.1	+0.5254	.5184	.2414	+72	-15
$\rho$ Aquarii	5 $\frac{1}{2}$	3.56	17.5	8 25.4	22 40.7	+ 7 27.8	+0.9858	.5177	.2421	+82	+12
$\kappa$ Aquarii	5	3.42	17.6	4 50.8	$\begin{smallmatrix} 7 & 7 & 43.7 \\ & - & 7 & 45.4 \end{smallmatrix}$	- 7 45.4	-0.6089	.5126	.2453	+10	-82
B. A. C. 8152	6 $\frac{1}{2}$	3.16	18.1	- 0 22.1	$\begin{smallmatrix} 8 & 7 & 55.0 \\ & - & 8 & 16.0 \end{smallmatrix}$	- 8 16.0	+0.5498	.5030	.2463	+76	-14
$\alpha$ Piscium	4 $\frac{1}{2}$	+3.14	+18.1	+ 0 35.9	9 44.9	- 6 29.2	-0.0432	.5024	+2.460	+40	-44
9 Piscium	6	3.14	18.0	0 27.8	9 55.2	- 6 19.1	+0.1443	.5023	.2460	+50	-35
15 Piscium	6 $\frac{1}{2}$	3.10	18.2	0 39.0	14 21.6	- 2 0.2	+1.0342	.5012	.2451	+90	+15
16 Piscium	6	3.09	18.0	1 26.2	14 51.5	- 1 31.2	+0.3054	.5011	.2450	+59	-26
$\lambda$ Piscium	5	3.08	18.3	1 7.2	17 54.9	+ 1 27.1	+1.3967	.5006	.2441	+90	+53
19 Piscium	6	+3.04	+17.9	+ 2 49.2	20 15.7	+ 3 43.9	+0.1239	.5003	+2.434	+49	-35
36 Piscium	6	2.87	16.9	7 34.4	$\begin{smallmatrix} 9 & 12 & 37.9 \\ & - & 4 & 21.4 \end{smallmatrix}$	- 4 21.4	-1.1275	.4993	.2362	-22	-83
$\delta$ Piscium	5 $\frac{1}{2}$	2.86	17.1	7 31.4	14 49.0	- 2 13.9	-0.5578	.4993	.2350	+13	-75
45 Piscium	6	2.83	17.3	7 1.6	17 34.8	+ 0 27.2	+0.6323	.4995	.2333	+84	-8
75 Piscium	6	2.65	15.5	12 18.7	$\begin{smallmatrix} 10 & 15 & 34.4 \\ & - & 2 & 10.2 \end{smallmatrix}$	- 2 10.2	-0.2148	.5031	.2163	+31	-50
$\eta$ Piscium	3 $\frac{1}{2}$	+2.56	+14.6	+14 43.5	$\begin{smallmatrix} 11 & 4 & 45.2 \\ & + & 10 & 37.8 \end{smallmatrix}$	+10 37.8	-0.1086	.5071	+2.034	+36	-42
101 Piscium	6	2.54	14.8	14 2.8	7 0.7	-11 10.5	+1.0985	.5079	.2009	+90	+86
105 Piscium	6	2.53	14.2	15 47.7	9 1.8	- 9 13.0	-0.4307	.5087	.1985	+19	-60
3 Arietis	6 $\frac{1}{2}$	2.51	13.7	16 48.6	12 36.9	- 5 44.2	-0.8486	.5101	.1943	- 5	-73
4 Arietis	6	2.50	13.9	16 21.4	13 27.0	- 4 55.5	-0.1864	.5104	.1933	+32	-45
$\iota$ Arietis	6	+2.48	+13.4	+17 13.8	18 10.5	- 0 20.4	-0.2520	.5124	+1.874	+28	-48
B. A. C. 632	6	2.46	13.2	17 40.5	21 26.2	+ 2 49.6	-0.1402	.5138	.1832	+34	-41
15 Arietis	6	2.43	12.6	18 55.9	$\begin{smallmatrix} 12 & 0 & 56.3 \\ & + & 6 & 13.3 \end{smallmatrix}$	+ 6 13.3	-0.8982	.5154	.1785	- 8	-71
$\theta$ Arietis	5 $\frac{1}{2}$	2.41	12.2	19 20.7	4 44.2	+ 9 54.4	-0.6866	.5172	.1732	+ 5	-71
26 Arietis	6 $\frac{1}{2}$	2.37	12.1	19 19.2	11 0.7	- 8 0.5	+0.3973	.5204	.1640	+67	-11
$\nu$ Arietis	5 $\frac{1}{2}$	+2.35	+11.3	+21 26.4	15 2.7	- 4 6.0	-1.2996	.5225	+1.574	-49	-60
$\mu$ Arietis	5 $\frac{1}{2}$	2.32	11.8	19 29.9	16 49.8	- 2 22.4	+1.1285	.5235	.1550	+90	+35
$\epsilon$ Arietis	4 $\frac{1}{2}$	2.28	11.0	20 51.5	$\begin{smallmatrix} 13 & 1 & 3.2 \\ & + & 5 & 35.9 \end{smallmatrix}$	+ 5 35.9	+0.8408	.5280	.1412	+90	+16
66 Arietis	6 $\frac{1}{2}$	2.19	9.7	22 23.3	15 1.0	- 4 53.1	+0.9448	.5356	.1156	+90	+26
7 Tauri	6	+2.19	+ 9.1	+24 3.6	17 48.5	- 2 11.0	-0.5852	.5371	+1.101	+ 9	-59

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

July.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. Δα Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N'n.	S'n.
9 Tauri	6	+2.17 + 9.3	+22 48.7	13 19 1.2	- 1 0.7	+0.9243	.5377	+1078	+90	+25
11 Tauri	6	2.18 8.6	24 56.3	20 45.2	+ 0 39.9	-1.2397	.5386	.1043	-43	-65
g Pleiadum	5½	2.16 8.8	23 54.6	22 39.3	+ 2 30.3	+0.0916	.5397	.1006	+48	-19
b Pleiadum	4	2.16 8.8	23 44.0	22 41.5	+ 2 32.4	+0.2893	.5397	.1006	+60	- 9
m Pleiadum	7	2.16 8.8	24 27.6	22 48.5	+ 2 39.1	-0.4995	.5397	.1003	+14	-53
e Pleiadum	5	+2.16 + 8.7	+24 5.3	22 50.3	+ 2 40.9	-0.0873	.5398	+1002	+37	-20
c Pleiadum	5	2.16 8.7	23 59.4	23 7.7	+ 2 57.6	+0.0496	.5399	.0997	+45	-22
d Pleiadum	5	2.15 8.8	23 34.3	23 22.2	+ 3 11.7	+0.5350	.5400	.0992	+79	+ 4
γ Tauri	3	2.15 8.8	23 43.9	23 54.3	+ 3 42.8	+0.4117	.5403	.0981	+69	- 3
f Pleiadum	4	2.14 8.7	23 41.1	14 0 41.1	+ 4 28.0	+0.5404	.5407	.0965	+80	+ 4
k Pleiadum	5½	+2.14 + 8.7	+23 46.1	0 41.6	+ 4 28.5	+0.4490	.5407	+0964	+72	- 1
B. A. C. 1192	6	2.15 8.3	25 12.8	1 11.2	+ 4 57.0	-1.0985	.5410	.0955	-27	-65
36 Tauri	6	2.10 8.2	23 48.5	7 41.4	+11 14.2	+1.0651	.5443	.0818	+90	+38
χ¹ Tauri	5½	2.07 7.3	25 20.6	15 56.8	- 4 47.1	-0.0614	.5482	.0639	+39	-24
χ² Tauri	5½	2.07 7.3	25 20.9	15 57.0	- 4 46.9	-0.0666	.5482	.0639	+38	-24
k Tauri	5½	+1.98 + 6.1	+24 51.8	15 7 52.1	+10 35.3	+1.1888	.5544	+0269	+90	+54
118 Tauri	6	1.91 4.8	25 3.1	21 33.9	- 0 11.7	+1.1225	.5582	-0061	+90	+50
125 Tauri	6	1.89 4.3	25 49.7	16 2 7.2	+ 4 11.9	+0.2230	.5590	.0173	+56	- 4
139 Tauri	5½	1.86 3.6	25 56.3	10 5.0	+11 52.8	-0.1112	.5600	.0367	+36	-24
5 Geminorum	6	1.83 3.3	24 26.7	16 1.2	- 6 23.6	+1.2428	.5603	.0514	+90	+59
e Geminor.	3½	+1.80 + 1.9	+25 15.0	17 6 7.7	+ 7 12.9	-0.5038	.5596	-0854	+ 9	-57
ξ Leonis	6	1.67 - 6.1	11 50.0	20 10 36.0	+ 9 4.7	+1.0292	.5375	.2271	+90	+19
18 Leonis	6	1.70 6.5	12 21.9	17 27.8	- 8 16.8	-1.1117	.5355	.2347	-21	-78
B. A. C. 3345	6	1.70 6.7	11 59.2	18 1.5	- 7 44.2	-0.8498	.5353	.2353	- 4	-78
B. A. C. 3398	6	1.69 7.4	9 30.2	22 18.7	- 3 35.2	+0.7154	.5342	.2305	+90	- 2
B. A. C. 3407	6	+1.69 - 7.6	+ 8 53.3	23 7.4	- 2 48.1	+1.1625	.5340	-2403	+90	+27
π Leonis	5	1.69 7.7	8 37.3	21 0 7.9	- 1 49.5	+1.1937	.5339	.2412	+90	+30
B. A. C. 3529	6	1.73 8.9	7 2.2	9 56.4	+ 7 40.2	+0.4301	.5320	.2490	+68	-19
43 Leonis	6	1.73 8.9	7 9.2	11 7.9	+ 8 49.4	+0.0118	.5318	.2497	+43	-40
34 Sextantis	6	1.78 10.3	4 12.7	20 39.5	- 5 57.2	+0.6452	.5307	.2550	+85	- 8
35 Sextantis	6	+1.78 -10.1	+ 5 22.7	20 59.6	- 5 37.7	-0.6445	.5307	-2551	+ 8	-82
p¹ Leonis	6	1.83 11.5	2 36.5	22 8 27.7	+ 5 23.6	-0.7394	.5304	.2591	+ 3	-64
p² Leonis	5	1.85 12.3	+ 0 35.1	11 46.4	+ 8 41.1	+0.4822	.5305	.2596	+71	-17
s Leonis	5	1.91 13.5	- 2 20.4	19 46.6	- 7 34.0	+1.4012	.5307	.2600	+88	+54
B. A. C. 4006	6	1.99 14.6	4 39.9	22 5 44.3	+ 2 4.6	+1.1945	.5333	.2586	+86	+27
B. A. C. 4201	6	+2.18 -16.6	- 8 0.6	23 12.4	- 5 1.3	+0.1486	.5287	-2508	+49	-34
q Virginis	6	2.21 16.7	8 47.4	24 1 55.2	- 2 23.8	+0.2638	.5398	.2488	+55	-28
B. A. C. 4312	6½	2.31 17.3	9 41.1	19 2.8	+ 5 27.6	-0.8216	.5436	.2423	- 4	-90
69 Virginis	5½	2.55 19.0	15 21.1	25 2 17.5	- 2 51.0	+1.1334	.5528	.2245	+75	+24
75 Virginis	6	2.60 18.8	14 44.7	4 41.3	- 0 32.2	-0.0146	.5542	.2313	+36	-43
83 Virginis	6	+2.69 -19.0	-15 34.5	9 46.6	+ 4 22.3	-0.2800	.5574	-2141	+21	-58
85 Virginis	6	2.69 18.9	15 9.9	10 15.4	+ 4 50.1	-0.7991	.5578	.2133	- 7	-90
87 Virginis	6	2.71 19.6	17 15.5	11 1.8	+ 5 34.9	+1.1577	.5583	.2121	+73	+27
80 Virginis	5	2.73 19.6	17 32.2	12 5.9	+ 6 36.7	+1.2128	.5590	.2104	+72	+33
B. A. C. 4722	6	2.92 19.0	17 38.4	23 0.9	- 6 52.0	-0.8792	.5664	.1919	-14	-90
B. A. C. 4739	6½	+2.95 -19.1	-18 9.6	26 0 22.1	- 5 33.8	-0.6123	.5673	-1893	+ 1	-85
B. A. C. 4923	6	3.27 18.6	20 52.4	16 17.8	+ 9 46.0	-0.6304	.5782	.1565	- 4	-88
B. A. C. 4984	6	3.40 18.8	23 31.6	21 18.6	- 9 24.8	+1.2869	.5814	.1450	+67	+53
B. A. C. 5023	6	3.44 17.9	21 57.4	23 56.6	- 6 52.8	-0.6637	.5831	.1385	- 8	-90
42 Libræ	5½	3.64 17.1	23 25.7	27 9 21.2	+ 2 9.6	-0.3694	.5885	.1147	+ 6	-66
B. A. C. 5197	6	+3.71 -17.0	-21 20.3	11 30.6	+ 4 13.8	+0.3094	.5897	-1089	+41	-35
b Scorpii	5	3.77 16.9	25 23.2	13 29.3	+ 6 7.8	+1.1569	.5907	.1036	+65	+33
A¹ Scorpii	5	3.77 16.6	24 58.1	14 31.1	+ 7 7.1	+0.6302	.5912	.1007	+61	- 6
B. A. C. 5253	6	3.76 16.3	24 10.5	14 38.7	+ 7 14.4	-0.1840	.5913	.1003	+14	-53
B. A. C. 5254	6	+3.75 -16.1	-23 37.2	14 40.1	+ 7 15.8	-0.7461	.5913	-1003	-16	-90

**ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.**

**July.**

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N'n.	S'n.
B. A. C. 5255	6	+3.79 -16.6	-25 3.2	<b>27</b> 14 44.9	+ 7 20.4	+0.6932	.5914	-.1001	+64	- 3
3 Scorpii	6	3.79 16.5	24 53.4	14 55.6	+ 7 30.6	+0.5099	.5914	.0996	+53	-14
B. A. C. 5286	6½	3.81 16.1	24 29.6	16 27.3	+ 8 58.6	-0.0393	.5922	.0954	+21	-44
$\pi$ Scorpii	3	3.84 16.4	25 46.1	16 32.0	+ 9 3.2	+1.2405	.5922	.0952	+65	+45
B. A. C. 5314	6	3.86 16.1	25 31.9	18 16.6	+10 43.5	+0.8395	.5929	.0904	+65	+ 7
B. A. C. 5347	5	+3.90 -15.9	-26 0.3	20 6.0	-11 31.5	+1.1580	.5937	-.0852	+64	+34
$\sigma$ Scorpii	3½	3.97 14.6	25 18.3	<b>28</b> 1 7.9	- 6 41.9	+0.0578	.5957	.0708	+24	-39
$\alpha$ Scorpii	1½	4.05 14.1	26 9.9	4 15.2	- 3 42.3	+0.7202	.5968	.0618	+64	- 1
22 Scorpii	5	4.03 13.7	24 51.0	4 35.1	- 3 23.1	-0.6288	.5968	.0609	-13	-90
25 Scorpii	6	4.17 12.2	25 18.8	10 54.5	+ 2 40.7	-0.4873	.5985	.0421	- 7	-75
B. A. C. 5641	6½	+4.17 -11.5	-24 37.6	12 37.8	+ 4 19.7	-1.2491	.5988	-.0369	-61	-90
B. A. C. 5709	6	4.23 10.8	24 54.7	15 53.1	+ 7 27.1	-1.0656	.5992	.0272	-44	-90
26 Ophiuchi	6	4.23 10.8	24 48.4	15 57.4	+ 7 31.2	-1.1744	.5992	.0269	-53	-90
B. A. C. 5800	6½	4.36 10.1	26 50.4	21 14.8	-11 24.6	+0.7836	.5995	.0109	+63	+ 4
A' Ophiuchi	5½	4.37 9.7	26 25.5	21 42.3	-10 58.2	+0.3591	.5996	.0095	+35	-22
A" Ophiuchi	6	+4.37 - 9.7	-26 25.5	21 42.4	-10 58.1	+0.3581	.5996	-.0095	+35	-22
38 Ophiuchi	6½	4.38 9.6	26 29.8	22 33.0	-10 9.6	+0.4236	.5996	.0068	+39	-18
$\theta$ Ophiuchi	3½	4.38 8.7	24 52.7	<b>29</b> 0 14.0	- 8 32.7	-1.2204	.5995	-.0018	-59	-90
B. A. C. 5909	6½	4.45 8.1	26 10.7	3 53.4	- 5 2.3	+0.1075	.5994	+.0092	+21	-36
B. A. C. 6024	6½	4.57 6.4	27 1.3	10 56.8	+ 1 43.6	+1.1043	.5983	.0306	+63	+29
63 Ophiuchi	6½	+4.51 - 5.3	-24 51.8	12 43.6	+ 3 26.1	-1.0252	.5979	+.0358	-40	-90
B. A. C. 6217	6½	4.62 2.5	24 58.2	22 56.6	-10 45.9	-0.3975	.5946	.0658	0	-63
$\lambda$ Sagittarii	3	4.66 2.2	25 29.3	<b>30</b> 1 25.6	- 8 22.9	+0.2991	.5936	.0728	+37	-25
24 Sagittarii	6	4.62 0.9	24 7.2	3 45.2	- 6 8.9	-0.9143	.5926	.0794	-28	-90
26 Sagittarii	6	4.65 - 0.1	23 56.7	6 52.1	- 3 9.5	-0.8337	.5910	.0880	-22	-90
B. A. C. 6369	6	+4.72 + 0.1	-25 8.1	8 0.5	- 2 3.8	+0.4806	.5904	+.0911	+50	-15
B. A. C. 6448	6	4.68 1.9	23 19.4	12 27.3	+ 2 12.4	-0.9335	.5879	.1031	-27	-90
B. A. C. 6485	6½	4.68 2.5	22 51.7	14 41.4	+ 4 21.3	-1.1684	.5867	.1089	-45	-90
B. A. C. 6490	6½	4.75 2.1	25 0.8	14 58.8	+ 4 38.0	+1.0590	.5865	.1096	+65	+23
B. A. C. 6524	6½	+4.67 + 3.2	-22 40.8	16 49.5	+ 6 24.3	-1.1158	.5853	+1.144	-40	-90
B. A. C. 6576	6	4.75 3.7	24 23.0	20 13.7	+ 9 40.6	+1.0273	.5831	.1229	+66	+20
B. A. C. 6607	6	4.69 4.7	22 37.5	22 19.5	+11 41.5	-0.5063	.5817	.1281	0	-76
50 Sagittarii	6	4.67 5.3	22 0.8	<b>31</b> 0 38.8	-10 4.5	-0.8299	.5800	.1336	-18	-90
B. A. C. 6671	6	+4.66 + 6.0	-21 33.6	2 31.5	- 8 16.1	-1.0382	.5777	+1.380	-31	-90
B. A. C. 6699	6½	4.73 6.2	23 34.2	4 26.0	- 6 25.9	+1.2674	.5772	.1425	+67	+51
B. A. C. 6889	6	4.70 9.6	21 39.1	16 44.4	+ 5 25.0	+1.2414	.5675	.1687	+69	+39
$\sigma$ Capricorni	5½	+4.62 +11.4	-19 29.5	22 58.9	+11 25.9	+0.1089	.5625	+.1805	+38	-36

**August.**

$\pi$ Capricorni	5	+4.59 +12.2	-18 36.2	<b>1</b> 2 27.1	- 9 13.3	-0.1710	.5596	+.1867	+24	-52
$\rho$ Capri., mult.	5	4.58 12.5	18 12.5	3 8.1	- 8 33.6	-0.4508	.5590	.1878	+ 9	-71
B. A. C. 7043	6½	4.57 12.5	17 49.8	3 11.6	- 8 30.3	-0.8318	.5589	.1881	-12	-90
B. A. C. 7053	6	4.60 12.7	18 58.8	3 33.9	- 8 8.8	+0.4271	.5586	.1886	+56	-19
$\sigma$ Capri., mult.	5½	4.60 12.7	18 58.7	3 34.5	- 8 8.2	+0.4265	.5586	.1886	+56	-19
B. A. C. 7097	6	+4.54 +13.3	-16 56.3	6 5.6	- 5 42.5	-1.2028	.5567	+.1928	-38	-90
$\nu$ Capricorni	5½	4.59 13.5	18 33.6	8 4.3	- 3 47.8	+0.8600	.5550	.1959	+72	+ 6
B. A. C. 7145	6½	4.53 13.5	16 33.0	8 19.9	- 3 32.8	-1.1692	.5548	.1963	-35	-90
B. A. C. 7263	6	4.51 15.3	16 29.6	16 2.8	+ 3 54.2	+0.3291	.5486	.2085	+53	-25
29 Capricorni	6	4.47 17.0	15 40.1	<b>2</b> 0 23.8	+11 58.4	+1.2537	.5422	.2182	+75	+35
18 Aquarii	6	+4.38 +17.8	-13 23.4	4 23.6	- 8 9.7	-0.2412	.5391	+.2228	+25	-56
$\lambda$ Capricorni	5½	4.32 19.3	11 55.1	15 6.6	+ 2 12.6	+0.6612	.5313	.2329	+77	- 7
B. A. C. 7620	6	4.28 19.7	10 52.4	18 34.3	+ 5 33.8	+0.3753	.5289	.2355	+60	-22
$\theta$ Aquarii	4½	4.18 21.2	8 22.8	<b>3</b> 6 7.0	+ 7 14.9	+0.5217	.5218	.2425	+72	-15
$\rho$ Aquarii	5½	+4.16 +21.4	- 8 25.3	7 49.1	- 5 35.9	+0.9690	.5208	+.2433	+82	+11

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

August.

Star's—				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$	Apparent Declination. $\Delta\delta$	Washington Mean Time. $d^h m$	Hour Angle $H$ $h^m$	$Y$	$z'$	$y'$	N'n.	S'n.		
$\alpha$ Aquarii	5	+4.06	+21.9	- 4 50.7	2 16 47.4	+ 3 6.2	-0.6249	.5161	+2466	+ 9	-83	
B. A. C. 8152	6½	3.87	23.2	- 0 22.1	4 16 42.5	+ 2 19.4	+0.5240	.5074	.2484	+74	-15	
$\alpha$ Piscium	4½	3.85	23.1	+ 0 36.0	18 31.1	+ 4 4.9	-0.0676	.5070	.2479	+38	-46	
9 Piscium	6	3.85	23.1	0 27.9	18 41.2	+ 4 14.7	+0.1196	.5069	.2478	+49	-36	
15 Piscium	6½	3.83	23.3	0 39.1	23 4.3	+ 8 30.2	+1.0044	.5059	.2469	+90	+13	
16 Piscium	6	+3.81	+23.2	+ 1 26.2	23 33.9	+ 8 59.0	+0.2781	.5058	+2467	+58	-28	
1 Piscium	5	3.80	23.4	1 7.3	5 2 35.0	+11 55.0	+1.3643	.5052	.2459	+90	+46	
19 Piscium	6	3.77	23.1	2 49.3	4 54.0	- 9 50.0	+0.0961	.5048	.2452	+47	-37	
36 Piscium	6	3.67	22.5	7 34.5	21 4.0	+ 5 52.6	-1.1540	.5034	.2403	-24	-83	
$\delta$ Piscium	6½	3.65	22.5	7 31.5	23 13.5	+ 7 58.5	-0.5875	.5034	.2366	+12	-77	
45 Piscium	6	+3.63	+22.6	+ 7 1.7	6 1 57.4	+10 37.7	+0.5970	.5034	+2349	+81	-10	
75 Piscium	6	3.50	21.0	12 18.8	23 43.2	+ 7 46.2	-0.2520	.5061	.2176	+29	-52	
$\eta$ Piscium	3½	3.43	19.9	14 43.6	7 12 47.2	- 3 31.9	-0.1487	.5093	.2040	+34	-45	
101 Piscium	6	3.41	20.0	14 2.9	15 2.5	- 1 21.1	+1.0549	.5099	.2026	+00	+23	
105 Piscium	6	3.41	19.4	15 47.8	17 2.8	+ 0 35.7	-0.4711	.5106	.1991	+17	-62	
3 Arietis	6½	+3.40	+18.9	+16 48.7	20 36.6	+ 4 3.1	-0.8886	.5117	+1948	- 7	-73	
4 Arietis	6	3.39	19.0	16 21.5	21 26.6	+ 4 51.8	-0.2250	.5120	.1938	+30	-47	
$\epsilon$ Arietis	6	3.36	18.5	17 13.9	8 2 8.6	+ 9 25.5	-0.2041	.5141	.1858	+26	-50	
B. A. C. 632	6	3.34	18.1	17 40.6	5 23.6	-11 25.3	-0.1831	.5144	.1847	+32	-44	
15 Arietis	6	3.34	17.4	18 56.0	8 52.9	- 8 2.3	-0.9404	.5162	.1785	-11	-71	
9 Arietis	5½	+3.32	+17.0	+19 20.7	12 40.3	- 4 22.0	-0.7298	.5178	+1732	+ 2	-71	
26 Arietis	6	3.27	16.6	19 19.3	18 56.2	+ 1 42.8	+0.3524	.5206	.1639	+64	-13	
$\alpha$ Arietis	5½	3.22	16.1	19 30.0	9 0 45.2	+ 7 21.0	+1.0827	.5233	.1547	+90	+31	
$\epsilon$ Arietis, mult.	4½	3.18	14.9	20 51.6	8 59.1	- 8 40.5	+0.7947	.5270	.1409	+90	+14	
66 Arietis	6½	3.09	13.1	22 23.3	22 59.2	+ 4 52.8	+0.8995	.5338	.1154	+90	+23	
7 Tauri, mult.	6	+3.10	+12.4	+24 3.6	10 1 47.4	+ 7 35.6	-0.6311	.5351	+1100	+ 7	-62	
9 Tauri	6	3.07	12.5	22 48.8	3 0.4	+ 8 46.2	+0.8792	.5357	.1076	+90	+22	
11 Tauri	6	3.08	11.8	24 56.4	4 44.9	+10 27.3	-1.2856	.5365	.1041	-54	-65	
$g$ Pleiadum	5½	3.06	11.9	23 54.6	6 39.6	-11 41.8	+0.0463	.5374	.1002	+45	-22	
$b$ Pleiadum	4	3.05	12.0	23 44.1	6 41.8	-11 39.6	+0.2441	.5374	.1001	+57	-12	
$m$ Pleiadum	7	+3.05	+12.0	+24 27.6	6 48.9	-11 32.7	-0.5449	.5375	+0099	+12	-56	
$e$ Pleiadum	5	3.06	11.9	24 5.4	6 50.6	-11 31.1	-0.1327	.5375	.0999	+34	-31	
$c$ Pleiadum	5	3.05	11.8	23 59.5	7 8.1	-11 14.2	+0.0043	.5376	.0993	+42	-24	
$d$ Pleiadum	5	3.05	11.7	23 34.4	7 22.7	-11 0.0	+0.4900	.5377	.0988	+75	+ 1	
$\eta$ Tauri	3	3.05	11.7	23 44.0	7 54.9	-10 28.9	+0.3666	.5380	.0977	+65	- 5	
29 Pleiadum	6½	+3.05	+11.6	+23 58.5	8 23.0	-10 1.7	+0.1456	.5382	+0967	+51	-16	
$f$ Pleiadum	4	3.05	11.6	23 41.1	8 42.0	- 9 43.3	+0.4952	.5383	.0961	+76	+ 2	
$A$ Pleiadum	5½	3.04	11.5	23 46.1	8 42.7	- 9 42.6	+0.4040	.5383	.0961	+68	- 3	
B. A. C. 1192	6	3.07	11.3	25 12.9	9 12.3	- 9 14.0	-1.1447	.5386	.0951	-32	-65	
36 Tauri	6	2.98	10.7	23 46.5	15 44.7	- 2 54.7	+1.0212	.5416	.0816	+90	+35	
$\chi^1$ Tauri	5½	+2.95	+ 9.4	+25 20.7	11 0 3.2	+ 5 7.1	-0.1058	.5453	+0635	+36	-27	
$\chi^2$ Tauri	8½	2.95	9.4	25 21.0	0 3.4	+ 5 7.3	-0.1009	.5453	.0635	+36	-27	
$\epsilon$ Tauri	5½	2.89	7.4	24 51.8	16 5.1	- 3 23.9	+1.1484	.5514	+0271	+90	+50	
118 Tauri	6	2.69	5.6	25 3.1	19 5 52.6	+ 9 54.8	+1.0849	.5549	-0058	+90	+47	
125 Tauri	6	2.67	4.7	25 49.7	10 27.7	- 9 39.7	+0.1854	.5560	.0169	+54	- 6	
139 Tauri	5½	+2.61	+ 3.7	+25 56.3	18 28.3	- 1 56.0	-0.1465	.5575	-0362	+34	-26	
5 Geminorum	6	2.52	3.3	24 26.7	13 0 26.3	+ 3 49.2	+1.2086	.5580	.0508	+90	+54	
B. A. C. 2154	6½	2.44	1.6	24 41.3	11 46.6	- 9 14.5	+0.2109	.5581	.0782	+55	-11	
$\epsilon$ Geminorum	3½	2.43	1.2	25 15.0	14 35.8	- 6 31.3	-0.6216	.5580	.0849	+ 7	-59	
B. A. C. 2238	6	2.38	1.0	23 44.6	18 10.6	- 3 4.1	+0.6770	.5579	.0933	+90	+12	
$\omega$ Geminorum	6	+2.35	+ 0.4	+24 23.2	22 43.6	+ 1 19.3	-0.4609	.5575	-1039	+16	-51	
44 Geminorum	6½	2.32	+ 0.4	23 49.0	14 0 2.2	+ 2 35.1	+1.0812	.5573	.1069	+90	+37	
48 Geminorum	6	2.32	- 0.2	34 19.8	3 8.5	+ 5 34.9	-0.8788	.5569	.1140	- 9	-66	
$\delta$ Gemi., mult.	3½	2.26	0.3	22 12.2	6 34.8	+ 8 54.2	+ 1.9661	.5564	.1216	+90	+29	
58 Geminorum	6	+2.26	- 0.6	+23 10.6	8 2.1	+10 18.5	-0.2315	.5560	-1249	+29	-39	

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

August.

Star's—				At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. Δa Δd	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N'n.	S'n
63 Gemi., mult.	5½	+2.22 - 0.7	+21 41.4	14 9 57.6	-11 50.4	+1.1066	.5558	-1.2892	+90	+37
85 Geminorum	5½	2.13 1.9	20 12.1	22 24.5	+ 0 10.7	+0.9072	.5532	.1555	+90	+90
♄ Leonis	5	1.80 11.1	+ 0 35.1	18 18 40.1	- 6 37.2	+0.5348	.5380	.2623	+75	-14
B. A. C. 4006	6	1.84 13.2	- 4 39.9	19 12 12.3	+10 20.1	+1.2543	.5406	.2613	+85	+33
Venus			6 19.2	20 1 14.2	- 1 4.0	-0.4492	.5341	.2430	+16	-72
B. A. C. 4201	6	+1.96 -14.7	- 8 0.6	5 17.2	+ 2 50.9	+0.2303	.5456	-.2533	+53	-30
γ Virginis	6	1.99 15.0	8 47.3	7 56.7	+ 5 25.0	+0.3463	.5466	.2513	+60	-24
B. A. C. 4312	6½	2.06 15.3	9 41.0	15 54.9	-10 52.9	-0.7259	.5499	.2445	+ 1	-90
69 Virginis	5	2.26 17.2	15 21.0	21 7 53.6	+ 4 32.5	+1.2226	.5570	.2258	+75	+33
75 Virginis	6	2.28 16.9	14 44.7	10 15.3	+ 6 49.1	+0.0829	.5584	.2226	+11	-38
83 Virginis	6	+2.36 -17.1	-15 34.5	15 16.8	+11 39.9	-0.1803	.5611	-.2151	+26	-53
85 Virginis	6	2.37 16.9	15 9.8	15 45.3	-11 52.7	-0.6968	.5614	.2144	- 1	-90
87 Virginis	6	2.38 17.5	17 15.2	16 31.1	-11 8.5	+1.2517	.5620	.2131	+73	+36
89 Virginis	5	2.40 17.5	17 32.1	17 34.6	-10 7.3	+1.3068	.5626	.2113	+73	+45
B. A. C. 4722	6	2.58 17.2	17 38.4	22 4 23.8	+ 0 18.3	-0.7747	.5687	.1924	- 8	-90
B. A. C. 4739	6½	+2.60 -17.2	-18 9.5	5 44.5	+ 1 36.0	-0.5096	.5695	-.1898	+ 6	-75
B. A. C. 4923	6	2.91 17.0	20 52.4	21 36.9	- 7 7.4	-0.5261	.5787	.1565	+ 2	-77
B. A. C. 5023	6	3.05 16.5	21 57.4	23 5 16.3	+ 0 14.2	-0.5609	.5823	.1384	- 2	-81
42 Libræ	5½	3.27 15.8	23 25.7	14 43.5	+ 9 19.2	-0.2679	.5867	.1144	+11	-58
B. A. C. 5197	6	3.32 15.8	24 20.3	16 53.7	+11 24.2	+0.4120	.5877	.1086	+47	-19
♏ Scorpii	5	+3.37 -15.9	-25 23.2	18 53.3	-10 41.0	+1.2627	.5884	-.1032	+65	+50
A² Scorpi., mult.	5	3.38 15.6	24 58.1	19 55.6	- 9 41.1	+0.7338	.5888	.1004	+65	0
B. A. C. 5253	6	3.37 15.3	24 10.5	20 3.2	- 9 33.8	-0.0830	.5888	.1001	+19	-47
B. A. C. 5254	6	3.36 15.1	23 37.2	20 4.6	- 9 32.5	-0.6468	.5888	.1001	-11	-90
B. A. C. 5255	6	3.38 15.7	25 3.2	20 9.5	- 9 27.7	+0.7971	.5489	.0998	+65	+ 4
3 Scorpii	6	+3.39 -15.4	-24 53.4	20 23.3	- 9 17.4	+0.6132	.5489	-.0994	+59	- 7
B. A. C. 5286	6½	3.41 15.0	24 29.6	21 52.7	- 7 48.7	+0.0619	.5895	.0952	+26	-39
B. A. C. 5314	6	3.47 15.1	25 31.9	23 43.0	- 6 2.8	+0.9434	.5901	.0901	+65	+14
B. A. C. 5347	5	3.52 15.0	26 0.3	24 1 33.6	- 4 16.5	+1.2633	.5906	.0850	+64	+51
σ Scorpii	3½	3.59 14.3	25 18.3	6 38.7	+ 0 36.3	+0.1575	.5919	.0707	+29	-33
α Scorpi., mult.	1½	+3.69 -13.7	-26 9.9	9 48.5	+ 3 38.4	+0.8224	.5926	-.0617	+64	+ 6
22 Scorpii	5	3.67 13.2	24 51.0	10 8.5	+ 3 57.7	-0.5333	.5926	.0607	- 8	-79
25 Scorpii	6	3.80 12.0	25 18.8	16 33.2	+10 6.9	-0.3938	.5937	.0420	- 2	-68
B. A. C. 5641	6½	3.81 11.4	24 37.6	18 18.0	+11 47.5	-1.1604	.5939	.0370	-51	-90
B. A. C. 5709	6	3.87 11.0	24 54.7	21 36.5	- 9 2.1	-0.9774	.5940	.0283	-37	-90
26 Ophiuchi	6	+3.90 -10.7	-24 48.4	21 40.8	- 8 58.0	-1.0869	.5940	-.0271	-45	-90
B. A. C. 5800	6½	4.02 10.3	26 50.4	25 3 3.6	- 3 48.4	+0.8820	.5940	.0112	+63	+10
A¹ Ophiuchi	5½	4.03 10.0	26 25.6	3 31.7	- 3 21.4	+0.4546	.5939	.0099	+42	-16
A² Ophiuchi	6	4.03 10.0	26 25.4	3 31.8	- 3 21.3	+0.4526	.5939	.0099	+42	-16
38 Ophiuchi	6½	4.04 10.0	26 29.8	4 23.3	- 2 31.8	+0.5190	.5937	.0073	+46	-13
θ Ophiuchi	3½	+4.02 - 8.8	-24 52.7	6 6.0	- 0 53.3	-1.1376	.5935	-.0023	-51	-90
B. A. C. 5909	6½	4.15 8.3	26 10.7	9 49.6	+ 2 41.3	+0.1984	.5930	+0.0087	+26	-31
B. A. C. 6024	6½	4.28 6.8	27 1.3	17 1.4	+ 9 35.6	+1.2001	.5916	.0286	+63	+40
63 Ophiuchi	6½	4.24 5.6	24 51.8	18 50.4	+11 26.3	-0.9484	.5911	.0348	-35	-90
B. A. C. 6217	6½	4.39 3.0	24 58.3	26 5 16.6	- 2 38.4	-0.3210	.5872	.0642	+ 3	-62
λ Sagittarii	3	+4.44 - 2.3	-25 29.3	7 48.8	- 0 12.2	+0.3803	.5861	+0.0712	+42	-21
24 Sagittarii	6	4.42 1.2	24 7.3	10 11.6	+ 2 5.0	-0.8457	.5851	.0777	-24	-90
B. A. C. 6343	6	4.43 0.5	23 36.4	12 2.8	+ 3 51.9	-1.2257	.5842	.0827	-54	-90
26 Sagittarii	6	4.47 0.4	23 56.7	13 22.7	+ 5 8.6	-0.7669	.5840	.0861	-19	-90
B. A. C. 6369	6	4.52 - 0.3	25 8.1	14 32.6	+ 6 15.8	+0.5594	.5830	.0893	+55	-10
B. A. C. 6448	6	+4.50 + 1.4	-23 19.4	19 5.5	+10 38.2	-0.8714	.5807	+0.1010	-23	-90
B. A. C. 6485	6½	4.51 2.0	22 51.7	21 22.7	-11 9.8	-1.1102	.5794	.1067	-40	-90
B. A. C. 6490	6½	4.59 1.7	25 0.8	21 40.5	-10 52.7	+1.1387	.5793	.1075	+65	+31
B. A. C. 6524	6½	4.53 2.8	22 40.8	23 33.7	- 9 3.9	-1.0593	.5780	.1122	-35	-90
B. A. C. 6576	6	+4.63 + 3.1	-24 23.0	27 3 2.5	- 5 43.1	+1.1020	.5758	+0.1206	+66	+26

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

### August.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	$\alpha'$	$y'$	N'n.	S'n.
B. A. C. 6607	6	+4.58	+ 4.1	-22° 37.6	<sup>d</sup> 27 5 11.2	<sup>h</sup> - 3 39.2	-0.4480	.5743	+1.256	+ 3	-71
50 Sagittarii	6	4.58	5.1	22 0.8	7 33.7	- 1 22.0	-0.7764	.5727	.1311	-15	-90
B. A. C. 6671	6	4.58	5.6	21 33.6	9 28.9	+ 0 28.9	-0.9884	.5715	.1355	-28	-90
B. A. C. 6889	6	4.60	9.1	21 39.1	28 0 0.4	- 9 31.4	+1.2996	.5612	.1658	+69	+50
$\sigma$ Capricorni	5½	4.65	11.1	19 29.5	6 22.6	- 3 22.7	+0.1501	.5567	.1775	+40	-34
$\pi$ Capricorni	5	+4.62	+12.2	-18 36.2	9 54.8	+ 0 2.1	-0.1360	.5541	+1.837	+25	-50
$\rho$ Capri., <i>mult.</i>	5	4.61	12.6	18 12.5	10 36.6	+ 0 42.5	-0.4190	.5536	.1848	+12	-68
B. A. C. 7043	6½	4.60	12.6	17 49.8	10 43.2	+ 0 45.9	-0.8035	.5536	.1849	-10	-90
B. A. C. 7053	5½	4.63	12.4	18 58.8	11 3.0	+ 1 8.0	+0.4665	.5532	.1856	+59	-17
$\sigma$ Capricorni	5½	4.63	12.3	18 58.7	11 3.5	+ 1 8.5	+0.4656	.5532	.1856	+59	-17
B. A. C. 7097	6	+4.59	+13.3	-16 56.2	13 37.7	+ 3 37.3	-1.1806	.5513	+1.897	-36	-90
$\sigma$ Capricorni	5½	4.64	13.4	18 33.6	15 38.6	+ 5 34.1	+0.8184	.5499	.1930	+72	+ 8
B. A. C. 7145	6½	4.55	13.8	16 33.0	15 54.3	+ 5 49.3	-1.1492	.5496	.1934	-33	-90
B. A. C. 7263	6	4.61	15.6	16 29.6	23 45.2	-10 35.8	+0.3528	.5440	.2047	+54	-23
29 Capricorni	6	4.60	17.6	15 40.1	29 8 14.1	- 2 23.5	+1.2738	.5382	.2155	+75	+39
18 Aquarii	6	+4.56	+18.6	-13 23.4	12 17.2	+ 1 31.7	-0.2369	.5357	+2.201	+25	-55
$\lambda$ Capricorni	5½	4.52	20.7	11 55.1	23 8.1	-11 58.1	+0.5572	.5290	.2305	+77	- 7
B. A. C. 7320	6	4.51	21.4	10 52.4	30 2 37.9	- 8 34.8	+0.3650	.5269	.2332	+60	-23
$\theta$ Aquarii	4½	4.45	23.2	8 22.7	14 16.5	+ 2 42.4	+0.4838	.5209	.2407	+69	-17
$\rho$ Aquarii	5½	4.44	23.5	8 25.3	15 59.1	+ 4 21.9	+0.9423	.5201	.2416	+82	+ 9
$\alpha$ Aquarii	5	+4.37	+24.6	- 4 50.7	31 1 0.2	-10 53.2	-0.6708	.5161	+2.452	+ 6	-48

### September.

B. A. C. 8152	6½	+4.29 +26.5	- 0 22.0	1 0 57.1	-11 38.2	+0.4486	.5089	+2.475	+69	-19
$\alpha$ Piscium	4½	4.28 26.6	+ 0 36.0	2 45.6	- 9 52.8	-0.1465	.5085	.2473	+34	-50
9 Piscium	6	4.28 26.6	0 27.9	2 55.6	- 9 43.1	+0.0407	.5085	.2472	+44	-40
15 Piscium	6½	4.28 26.7	0 39.1	7 18.2	- 5 28.1	+0.9208	.5076	.2463	+90	+ 8
16 Piscium	6	4.28 26.7	1 26.3	7 47.7	- 4 59.4	+0.1929	.5076	.2464	+53	-32
$\lambda$ Piscium	5	+4.28 +26.9	+ 1 7.3	10 48.3	- 2 3.9	+1.2764	.5071	+2.457	+90	+35
19 Piscium	6	4.26 26.8	2 49.4	13 6.9	+ 0 10.8	+0.0039	.5069	.2450	+42	-50
36 Piscium	6	4.22 26.8	7 34.6	9 5 12.6	- 8 11.0	-1.2662	.5062	.2380	-34	-83
$d$ Piscium	5½	4.21 26.7	7 31.5	7 21.4	- 6 5.8	-0.7026	.5062	.2367	+ 5	-63
45 Piscium	6	4.20 27.0	7 1.8	10 4.4	- 3 27.5	+0.4787	.5063	.2350	+71	-16
75 Piscium	6	+4.15 +25.7	+12 18.9	3 7 42.3	- 5 26.9	-0.3926	.5013	+2.178	+21	-60
$\eta$ Piscium	3½	4.13 24.5	14 43.7	20 42.4	+ 6 10.5	-0.3007	.5122	.2043	+26	-53
101 Piscium	6	4.12 24.4	14 2.9	22 56.5	+ 8 20.6	+0.9005	.5127	.2017	+90	+12
105 Piscium	6	4.12 24.0	15 47.9	4 0 56.1	+10 16.8	-0.6263	.5133	.1993	+ 8	-72
3 Arietis	6½	4.12 23.6	16 48.7	4 29.0	-10 16.6	-1.0462	.5143	.1950	-18	-73
4 Arietis	6	+4.11 +23.5	+16 21.6	5 18.6	- 9 28.5	-0.3864	.5147	+1.938	+21	-57
$\epsilon$ Arietis	6	4.11 23.0	17 13.9	9 59.6	- 4 55.8	-0.4559	.5161	.1877	+17	-60
B. A. C. 632	6	4.09 22.6	17 40.7	13 13.8	- 1 48.0	-0.3467	.5173	.1834	+23	-53
15 Arietis	6	4.09 22.1	18 56.1	16 42.5	+ 1 35.0	-1.1064	.5184	.1786	-24	-71
$\theta$ Arietis	5½	+4.08 +21.7	+19 20.8	20 29.3	+ 5 14.9	-0.8980	.5198	+1.732	- 9	-71
26 Arietis	6	4.06 20.9	19 19.4	5 2 44.4	+11 18.7	+0.1813	.5221	.1636	+52	-22
$\mu$ Arietis	5½	4.05 20.2	19 30.0	8 33.1	- 7 3.4	+0.9099	.5243	.1544	+90	+19
47 Arietis	6	4.03 19.0	20 11.3	16 14.1	+ 0 23.3	+1.2868	.5273	.1415	+90	+55
$\epsilon$ Arietis	4½	+4.03 +18.8	+20 51.6	16 47.3	+ 0 55.4	+0.6193	.5275	+1.406	+86	+ 4
66 Arietis	6½	3.98 16.5	22 23.4	6 49.8	- 9 28.8	+0.7213	.5333	.1149	+90	+12
7 Tauri, <i>mult.</i>	6	3.98 15.7	24 3.7	9 38.8	- 6 45.3	-0.8132	.5344	.1094	- 5	-66
9 Tauri	6	3.96 15.7	22 48.8	10 52.2	- 5 34.3	+0.7006	.5349	.1070	+90	+12
$\rho$ Pleiadum	5½	+3.95 +15.0	+23 54.7	14 32.6	- 2 1.1	-0.1347	.5363	+0.998	+34	-31
$\delta$ Pleiadum	4	3.95 15.0	23 44.1	14 34.8	- 1 59.0	+0.0637	.5364	.0997	+46	-21
$\eta$ Pleiadum	7	3.96 14.8	24 27.7	14 41.9	- 1 52.0	-0.7271	.5364	.0994	+ 1	-66
$\epsilon$ Pleiadum	5	+3.96 +14.9	+24 5.4	14 43.7	- 1 50.3	-0.3143	.5364	+0.994	+24	-41



ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

September.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N'a.	S'a.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
$\epsilon$ Pleiadum	5	+3.95	+14.9	+23 59.5	6 15 1.3	- 1 33.3	-0.1768	.5366	+.0968	+32	-34
$\delta$ Pleiadum	5	3.94	15.0	23 34.4	15 16.0	- 1 19.0	+0.3103	.5366	.0983	+61	- 8
$\gamma$ Tauri	3	3.94	14.8	23 44.0	15 48.4	- 0 47.8	+0.1866	.5368	.0973	+53	-14
20 Pleiadum	6 $\frac{1}{2}$	3.94	14.8	23 44.0	16 16.7	- 0 19.4	-0.0344	.5374	.0964	+40	-26
f Pleiadum	4	3.93	14.8	23 41.2	16 35.7	- 0 1.9	+0.3154	.5375	.0957	+62	- 8
$\lambda$ Pleiadum	5 $\frac{1}{2}$	+3.94	+14.7	+23 46.2	16 36.3	- 0 1.4	+0.2241	.5375	+.0957	+56	-12
36 Tauri	6	3.90	13.5	23 46.5	23 41.4	+ 6 49.7	+0.8429	.5399	.0811	+90	+23
$\chi$ Tauri	5 $\frac{1}{2}$	3.87	11.6	25 20.7	7 8 4.3	- 9 4.0	-0.2868	.5428	.0632	+26	-36
$\chi$ Tauri	8 $\frac{1}{2}$	3.86	11.6	25 21.0	8 4.5	- 9 3.8	-0.2887	.5428	.0632	+26	-36
62 Tauri	6	3.82	11.9	24 1.3	8 45.2	- 8 24.5	+1.2179	.5430	.0617	+90	+54
$\lambda$ Tauri	5 $\frac{1}{2}$	+3.72	+ 9.1	+24 51.9	8 0 16.9	+ 6 35.7	+0.9754	.5477	+.0271	+90	+37
118 Tauri	6	3.59	6.4	25 3.1	14 15.5	- 3 54.5	+0.9162	.5509	-.0056	+90	+35
125 Tauri	6	3.56	5.4	25 49.7	18 54.6	+ 0 34.9	+0.0143	.5516	.0164	+43	-15
139 Tauri	5 $\frac{1}{2}$	3.48	4.0	25 56.3	9 3 2.4	+ 8 25.9	-0.3157	.5524	.0357	+24	-35
5 Geminorum	6	3.37	3.2	24 26.7	9 6.0	- 9 43.2	+1.0503	.5527	.0499	+90	+40
B. A. C. 2154	6 $\frac{1}{2}$	+3.26	+ 1.1	+24 41.3	20 37.0	+ 1 23.8	+0.0541	.5528	-.0767	+45	-19
$\epsilon$ Geminor.	3 $\frac{1}{2}$	3.24	0.6	25 15.0	23 28.8	+ 4 9.7	-0.7807	.5528	.0833	- 3	-65
B. A. C. 2238	6	3.17	+ 0.3	23 44.6	10 3 6.9	+ 7 40.2	+0.5274	.5526	.0916	+78	+ 4
$\omega$ Geminorum	6	3.11	- 0.6	24 23.2	7 44.0	-11 52.4	-0.6125	.5524	.1020	+ 7	-60
44 Geminorum	6 $\frac{1}{2}$	3.07	0.5	22 49.0	9 3.5	-10 35.4	+0.9385	.5523	.1050	+90	+27
48 Geminorum	6	+3.07	- 1.3	+24 19.7	12 12.8	- 7 32.8	-1.0287	.5521	-.1121	-20	-66
$\delta$ Gem., mult.	3 $\frac{1}{2}$	2.98	1.5	22 12.2	15 42.1	- 4 10.8	+0.8478	.5517	.1201	+90	+20
58 Geminorum	6	2.99	1.9	23 10.6	17 10.6	- 2 45.3	-0.3736	.5514	.1229	+21	-47
63 Geminorum	5 $\frac{1}{2}$	2.94	1.8	21 41.4	19 7.7	- 0 52.3	+0.9720	.5512	.1270	+90	+27
85 Geminorum	5 $\frac{1}{2}$	2.76	3.6	20 12.1	11 7 44.0	+11 18.0	+0.7845	.5493	.1531	+90	+12
B. A. C. 2683	6	+2.70	- 3.9	+19 11.0	11 52.3	- 8 42.2	+1.2117	.5487	-.1613	+90	+43
$\delta$ Cancri	6	2.61	4.9	18 43.1	20 20.8	- 0 31.0	+0.2631	.5474	.1773	+57	-18
$\theta$ Cancri	6	2.58	5.3	18 30.0	12 0 6.7	+ 3 7.4	-0.1884	.5466	.1841	+32	-43
B. A. C. 2854	6	2.60	5.5	19 23.5	0 8.1	+ 3 8.7	-1.1301	.5466	.1842	-26	-71
54 Cancri	6 $\frac{1}{2}$	2.44	5.9	15 47.8	9 5.0	+11 47.5	+0.9247	.5451	.1991	+90	+16
$\alpha$ Cancri	6	+2.42	- 6.3	+15 47.0	11 56.4	- 9 26.8	+0.3609	.5445	-.2038	+64	-16
$\alpha$ Cancri	6	2.43	6.4	16 2.6	12 5.5	- 9 18.1	+0.0600	.5445	.2041	+45	-32
$\pi$ Cancri	6 $\frac{1}{2}$	2.36	7.0	15 28.8	18 56.3	- 2 40.9	-0.7854	.5435	.2143	- 1	-75
$\pi$ Cancri	6	2.36	7.2	15 26.4	20 16.3	- 1 23.6	-1.0299	.5433	.2162	-17	-75
$\xi$ Leonis	6	2.24	7.5	11 49.9	13 4 5.6	+ 6 10.0	+0.9746	.5423	.2267	+90	+15
18 Leonis	6	+2.21	- 8.2	+12 21.9	10 49.0	-11 19.0	-1.1259	.5416	-.2349	-23	-78
B. A. C. 3345	6	2.20	8.3	11 59.2	11 21.9	-10 48.1	-0.8652	.5416	.2355	- 5	-78
B. A. C. 3398	6	2.14	8.4	9 30.1	15 32.9	- 6 45.4	+0.6932	.5413	.2400	+90	- 3
B. A. C. 3407	6	2.12	8.4	8 53.3	16 20.3	- 5 59.6	+1.1340	.5413	.2408	+90	+25
$\pi$ Leonis	5	2.11	8.5	+ 8 37.3	17 16.2	- 5 5.6	+1.1814	.5412	.2417	+90	+29
69 Virginis	5 $\frac{1}{2}$	+2.06	-14.8	-15 21.0	17 15 20.5	-10 12.9	+1.3462	.5643	-.2281	+75	+51
75 Virginis	6	2.09	14.8	14 44.7	17 38.0	- 8 0.5	+0.2251	.5632	.2248	+48	-30
83 Virginis	6	2.14	15.0	15 34.4	22 30.6	- 3 18.7	-0.0276	.5709	.2173	+34	-43
85 Virginis	6	2.14	14.9	15 9.8	22 58.2	- 2 52.1	-0.5360	.5712	.2164	+ 8	-76
B. A. C. 4722	6	2.29	15.5	17 38.4	18 11 14.6	+ 8 56.6	-0.5981	.5782	.1942	+ 2	-83
B. A. C. 4739	6 $\frac{1}{2}$	+2.31	-15.5	-18 9.5	12 33.0	+10 12.6	-0.3340	.5789	-.1916	+15	-62
B. A. C. 4923	6	2.55	15.3	20 52.3	19 3 59.9	+ 1 3.1	-0.3372	.5871	.1578	+12	-63
B. A. C. 5023	6	2.68	15.0	21 57.3	11 28.1	+ 8 13.5	-0.3663	.5904	.1393	+ 8	-65
42 Libræ	5 $\frac{1}{2}$	2.84	14.3	23 25.6	20 42.8	- 6 54.1	-0.0709	.5937	.1152	+21	-46
B. A. C. 5197	6	2.89	14.2	24 20.3	22 50.3	- 4 51.7	+0.6036	.5944	.1091	+59	- 8
$\Lambda$ Scorpii, mult.	5	+2.95	-14.1	-24 58.1	20 1 48.7	- 2 0.6	+0.9234	.5951	-.1011	+65	+13
B. A. C. 5253	6	2.93	13.8	24 10.5	1 56.2	- 1 53.3	+0.1151	.5952	.1006	+29	-35
B. A. C. 5254	6	2.93	13.7	23 37.2	1 57.6	- 1 52.0	-0.4434	.5952	.1006	0	-71
B. A. C. 5255	6	2.95	14.1	25 3.2	2 2.4	- 1 47.5	+0.9861	.5952	.1004	+65	+17
3 Scorpii	6	+2.95	-14.0	-24 53.4	2 12.9	- 1 37.3	+0.8041	.5953	-.0997	+65	+ 5

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

September.

Star's—				At Conjunction in R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
B. A. C. 5286	6 $\frac{1}{2}$	+2.97 -13.7	-24° 29.6	20 3 43.7	- 0 10.2	+0.2592	.5957	-.0955	+37° -27°	
B. A. C. 5314	6	3.03 13.7	25 31.9	5 32.0	+ 1 33.7	+1.1334	.5960	.0903	+65 +31	
B. A. C. 5335	6 $\frac{1}{2}$	3.01 12.8	23 17.0	6 37.8	+ 2 36.8	-1.2210	.5962	.0872	-53 -90	
B. A. C. 5354	6 $\frac{1}{2}$	3.05 12.8	23 22.4	7 37.9	+ 3 34.4	-1.2179	.5963	.0843	-53 -90	
19 Scorpii	6	3.12 12.2	23 52.7	12 9.8	+ 7 55.2	-1.0639	.5969	.0713	-40 -90	
$\sigma$ Scorpii	3 $\frac{1}{2}$	+3.16 -12.7	-25 18.3	12 20.8	+ 8 5.8	+0.3575	.5970	-.0707	+41 -22	
$\alpha$ Scorpii, <i>mult.</i>	1 $\frac{1}{2}$	3.23 12.6	26 9.9	15 27.6	+11 5.0	+1.0184	.5972	.0618	+64 +21	
22 Scorpii	5	3.20 12.0	24 51.0	15 47.5	+11 23.7	-0.3268	.5973	.0609	+ 3 -63	
25 Scorpii	6	3.33 11.1	25 18.7	22 7.2	- 6 31.8	-0.1871	.5973	.0421	+ 8 -53	
18 Ophiuchi	6	3.33 10.6	24 25.7	23 14.2	- 5 27.5	-1.1246	.5973	.0388	-47 -90	
B. A. C. 5641	6 $\frac{1}{2}$	+3.34 -10.6	-24 37.6	23 50.9	- 4 52.3	-0.9484	.5973	-.0371	-34 -90	
B. A. C. 5709	6	3.40 10.1	24 54.7	31 3 7.2	- 1 44.0	-0.7669	.5971	.0273	-24 -90	
26 Ophiuchi	6	3.40 10.1	24 48.3	3 11.6	- 1 39.9	-0.8756	.5971	.0273	-31 -90	
B. A. C. 5800	6 $\frac{1}{2}$	3.56 9.6	26 50.4	8 31.5	+ 3 26.9	+1.0829	.5963	.0112	+63 +27	
A <sup>1</sup> Ophiuchi	5 $\frac{1}{2}$	3.56 9.2	26 25.5	8 59.3	+ 3 53.6	+0.6580	.5963	.0100	+57 - 4	
A <sup>2</sup> Ophiuchi	6	+3.56 - 9.2	-26 25.4	9 0.0	+ 3 54.3	+0.6567	.5963	-.0100	+57 - 4	
38 Ophiuchi	6 $\frac{1}{2}$	3.57 9.2	26 29.8	9 50.6	+ 4 42.9	+0.7218	.5961	.0073	+63 0	
$\theta$ Ophiuchi	3 $\frac{1}{2}$	3.57 8.2	24 52.7	11 32.6	+ 6 20.7	-0.5268	.5957	-.0023	-36 -90	
B. A. C. 5909	6 $\frac{1}{2}$	3.66 7.9	26 10.7	15 14.9	+ 9 53.9	+0.4032	.5948	+0.086	+38 -19	
63 Ophiuchi	6 $\frac{1}{2}$	3.78 5.5	24 51.8	22 0 13.8	- 5 28.9	-0.7413	.5916	.0347	-22 -90	
7 Sagittarii	6	+3.81 - 4.6	-24 16.9	3 20.2	- 2 30.0	-1.2153	.5904	+0.435	-56 -90	
9 Sagittarii	4 $\frac{1}{2}$	3.82 4.5	24 21.7	3 44.1	- 2 7.0	-1.1153	.5902	.0447	-46 -90	
B. A. C. 6217	6 $\frac{1}{2}$	3.94 3.0	24 58.3	10 40.0	+ 4 32.3	-0.1184	.5867	.0640	+14 -49	
$\lambda$ Sagittarii	3	3.98 2.6	25 29.3	13 12.5	+ 6 58.8	+0.5815	.5853	.0704	+55 - 9	
24 Sagittarii	6	3.98 1.6	24 7.3	15 35.7	+ 9 16.4	-0.6451	.5840	.0768	-13 -90	
B. A. C. 6343	6	+4.00 - 1.0	-23 36.4	17 27.4	+11 3.8	-1.0259	.5828	+0.816	-36 -90	
26 Sagittarii	6	4.02 0.8	23 56.7	18 47.6	-11 39.1	-0.5676	.5820	.0851	- 7 -82	
B. A. C. 6369	6	4.07 - 1.0	25 8.1	19 57.8	-10 31.7	+0.7582	.5812	.0882	+65 + 2	
$\nu$ Sagittarii	5	4.06 + 0.7	22 53.5	23 47.7	- 6 50.5	-1.1945	.5787	.0979	-49 -90	
$\nu^2$ Sagittarii	5	4.06 0.8	22 49.2	23 0 10.6	- 6 28.5	-1.2308	.5785	.0989	-53 -90	
B. A. C. 6448	6	+4.08 + 0.7	-23 19.5	0 32.3	- 6 7.4	-0.6758	.5782	+0.999	-12 -90	
B. A. C. 6485	6 $\frac{1}{2}$	4.10 1.4	22 51.7	2 50.4	- 3 54.8	-0.9160	.5867	.1055	-26 -90	
B. A. C. 6524	6 $\frac{1}{2}$	4.12 2.0	22 40.8	5 2.3	- 1 47.9	-0.8664	.5751	.1109	-22 -90	
B. A. C. 6576	6	4.21 2.4	24 23.0	8 32.8	+ 1 34.7	+1.2960	.5726	.1191	+66 +58	
B. A. C. 6607	6	4.20 3.4	22 37.6	10 42.6	+ 3 39.7	-0.2583	.5711	.1239	+12 -57	
50 Sagittarii	6	+4.21 + 4.2	-22 0.8	13 6.4	+ 5 58.1	-0.5895	.5694	+1.292	- 4 -84	
B. A. C. 6671	6	4.22 4.8	21 33.7	15 2.8	+ 7 50.2	-0.8037	.5679	.1337	-16 -90	
$\sigma$ Capricorni	5 $\frac{1}{2}$	4.37 10.4	19 29.5	24 12 11.9	+ 4 14.0	+0.3187	.5521	.1746	+49 -25	
$\pi$ Capricorni	5	4.37 11.5	18 36.2	15 47.2	+ 7 41.9	+0.0271	.5494	.1807	+34 -40	
$\rho$ Capricorni	5	4.36 11.8	18 12.5	16 29.5	+ 8 22.9	-0.2581	.5489	.1817	+19 -57	
B. A. C. 7043	6 $\frac{1}{2}$	+4.35 +11.9	-17 49.8	16 33.2	+ 8 26.4	-0.6449	.5488	+1.818	- 1 -88	
B. A. C. 7053	5 $\frac{1}{2}$	4.39 11.6	18 58.8	16 56.3	+ 8 48.7	+0.6311	.5485	.1825	+68 - 8	
$\sigma$ Capricorni	5 $\frac{1}{2}$	4.39 11.6	18 58.7	16 56.8	+ 8 49.2	+0.6306	.5485	.1825	+68 - 8	
B. A. C. 7097	6	4.35 12.8	16 56.2	19 33.0	+11 20.1	-1.0278	.5466	.1865	-24 -90	
$\nu$ Capricorni	5 $\frac{1}{2}$	4.42 12.7	18 33.6	21 35.9	-10 41.1	+1.0597	.5451	.1896	+72 +20	
B. A. C. 7145	6 $\frac{1}{2}$	+4.36 +13.4	-16 33.0	21 51.9	-10 25.7	-0.9993	.5449	+1.900	-22 -90	
B. A. C. 7263	6	4.42 14.9	16 29.5	25 5 50.0	- 2 43.5	+0.5003	.5393	.2015	+63 -15	
18 Aquarii	6	4.41 18.3	13 23.4	18 33.7	+ 9 35.6	-0.1126	.5311	.2164	+31 -48	
$\lambda$ Capricorni	5 $\frac{1}{2}$	4.44 20.3	11 55.0	26 5 34.7	- 3 43.9	+0.7639	.5248	.2267	+74 - 1	
B. A. C. 7680	6	4.44 21.3	10 52.4	9 7.8	- 0 17.4	+0.4679	.5229	.2296	+66 -17	
$\theta$ Aquarii	4 $\frac{1}{2}$	+4.44 +23.4	- 8 22.7	20 56.5	+11 10.0	+0.5646	.5172	+2.370	+74 -12	
$\rho$ Aquarii	5 $\frac{1}{2}$	4.45 23.5	8 25.3	22 40.4	-11 9.0	+1.0228	.5164	.2379	+82 +15	
$\kappa$ Aquarii	5	4.42 25.3	4 50.7	27 7 48.5	- 2 17.4	-0.6195	.5130	.2416	+ 9 -82	
B. A. C. 8152	6 $\frac{1}{2}$	4.45 28.0	- 0 22.0	28 8 0.1	- 2 47.5	+0.4488	.5072	.2445	+69 -18	
$\alpha$ Piscium	4 $\frac{1}{2}$	+4.44 +28.3	+ 0 36.1	9 49.5	- 1 1.2	-0.1484	.5070	+2.444	+34 -50	

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

September.

STAR'S—					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$		$d$ $h$ $m$	$h$ $m$					$^{\circ}$
9 Piscium	6	+4.44	+28.3	+ 0 28.0	28 9 59.6	- 0 51.4	+0.0379	.5069	+2443	+44	-40
15 Piscium	6½	4.46	28.5	0 39.1	14 24.2	+ 3 25.6	+0.9124	.5064	2436	+00	+ 7
16 Piscium	6	4.45	28.6	1 26.4	14 53.8	+ 3 54.4	+0.1799	.5064	2436	+52	-32
$\lambda$ Piscium	5	4.46	28.7	1 7.3	17 55.6	+ 6 51.1	+1.2615	.5062	2429	+90	+34
19 Piscium	6	4.45	29.0	2 49.5	20 15.2	+ 9 6.7	-0.0223	.5061	2423	+41	-43
22 Piscium	6	+4.46	+29.0	+ 2 16.0	22 14.0	+11 0.3	+1.3050	.5060	+2418	+90	+39
36 Pisc., <i>mult.</i>	6	4.48	29.6	7 34.7	29 12 25.0	+ 0 48.8	-1.3283	.5064	2357	-42	-83
$\delta$ Piscium	5½	4.49	29.6	7 31.6	14 34.3	+ 2 54.6	-0.7722	.5065	2346	+ 1	-76
45 Piscium	6	4.50	29.6	7 1.8	17 17.6	+ 5 33.3	+0.4070	.5068	2330	+66	-19
75 Piscium	6	+4.55	+29.0	+12 19.0	30 14 56.6	+ 2 35.0	-0.5125	.5104	+2164	+14	-68

October.

$\eta$ Piscium	3 $\frac{1}{2}$	+4.59	+28.1	+14 43.8	1 3 55.9	- 8 48.3	-0.4457	.5138	+3030	+18	-61
101 Piscium	6	4.59	28.0	14 3.0	6 9.7	- 6 38.4	+0.7532	.5145	2004	+90	+ 4
105 Piscium	6	4.62	27.5	15 47.9	8 9.2	- 4 42.4	-0.7793	.5151	.1981	- 1	-75
3 Arietis	6 $\frac{1}{2}$	4.63	27.0	16 48.8	11 41.7	- 1 16.2	-1.2061	.5163	.1935	-32	-73
4 Arietis	6	4.63	27.0	16 21.7	12 31.3	- 0 28.1	-0.5471	.5166	.1927	+12	-66
$\epsilon$ Arietis	6	+4.64	+26.5	+17 14.0	17 11.7	+ 4 4.0	-0.6248	.5182	+1868	+ 8	-70
B. A. C. 632	6	4.64	26.1	17 40.7	20 25.5	+ 7 11.9	-0.5211	.5194	.1824	+14	-63
15 Arietis	6	4.67	25.6	18 56.1	23 53.9	+10 34.1	-1.2784	.5205	.1776	-44	-71
$\theta$ Arietis	5 $\frac{1}{2}$	4.68	25.1	19 20.9	3 40.3	- 9 46.5	-1.0844	.5219	.1722	-23	-71
26 Arietis	6	4.68	24.3	19 19.4	9 54.8	- 3 43.3	-0.0132	.5242	.1629	+41	-32
B. A. C. 782	6 $\frac{1}{2}$	+4.65	+24.4	+18 21.2	11 24.2	- 2 16.7	+1.3041	.5247	+1605	+90	+55
$\mu$ Arietis	5 $\frac{1}{2}$	4.68	23.5	19 30.1	15 43.1	+ 1 53.2	+0.7084	.5264	.1535	+90	+ 6
47 Arietis	6	4.68	22.4	20 11.3	23 23.8	+ 9 20.6	+1.0757	.5293	.1406	+90	+33
$\epsilon$ Arietis	4 $\frac{1}{2}$	4.70	22.2	20 51.7	23 56.9	+ 9 52.6	+0.4065	.5296	.1396	+67	- 8
66 Arietis	6 $\frac{1}{2}$	4.72	19.5	22 23.5	3 14 0.0	- 0 31.0	+0.4925	.5339	.1140	+75	0
7 Tauri, mult.	6	+4.76	+18.6	+24 3.7	16 49.4	+ 2 12.9	-1.0488	.5357	+1084	-22	-66
9 Tauri	6	4.72	18.7	22 48.9	18 2.9	+ 3 24.1	+0.4678	.5360	.1061	+73	- 1
$\rho$ Pleiadum	5 $\frac{1}{2}$	4.74	17.7	23 54.7	21 43.9	+ 6 57.9	-0.3735	.5373	.0988	+21	-45
$\delta$ Pleiadum	4	4.73	17.8	23 44.2	21 46.1	+ 7 0.0	-0.1749	.5373	.0987	+32	-34
$\omega$ Pleiadum	7	4.76	17.6	24 27.7	21 53.3	+ 7 7.0	-0.9729	.5373	.0986	-16	-66
$\sigma$ Pleiadum	5	+4.74	+17.7	+24 5.5	21 55.0	+ 7 8.6	-0.5539	.5374	+0.984	+11	-56
$\epsilon$ Pleiadum	5	4.74	17.6	23 59.6	22 12.7	+ 7 25.8	-0.4163	.5374	.0980	+18	-47
$\delta$ Pleiadum	5	4.73	17.7	23 34.5	22 27.4	+ 7 40.0	+0.0719	.5375	.0973	+46	-20
$\eta$ Tauri	3	4.72	17.5	23 44.1	22 59.9	+ 8 11.4	-0.0527	.5377	.0963	+38	-27
29 Pleiadum	6 $\frac{1}{2}$	4.74	17.4	23 58.6	23 28.4	+ 8 39.0	-0.2747	.5379	.0953	+26	-36
$f$ Pleiadum	4	+4.73	+17.4	+23 41.2	23 47.4	+ 8 57.5	+0.0758	.5379	+0.947	+46	-20
$\lambda$ Pleiadum	5 $\frac{1}{2}$	4.73	17.4	23 46.2	23 48.0	+ 8 58.0	-0.0157	.5379	.0947	+41	-24
36 Tauri	6	4.70	16.1	23 46.6	4 6 54.9	- 8 9.1	+0.5993	.5401	.0802	+85	+ 9
$\chi^1$ Tauri	5 $\frac{1}{2}$	4.70	13.8	25 20.8	15 20.6	- 0 0.1	-0.5415	.5424	.0623	+11	-52
$\chi^2$ Tauri	8 $\frac{1}{2}$	+4.70	+13.8	+25 20.7	15 20.9	+ 0 0.2	-0.5434	.5424	+0.623	+11	-52
62 Tauri	6	4.66	14.2	24 1.3	16 1.8	+ 0 39.7	+0.9690	.5427	.0608	+90	+33
B. A. C. 1518	6	4.59	10.9	24 23.9	5 6 50.5	- 9 1.3	+1.2089	.5457	.0281	+90	+56
$\kappa$ Tauri	5 $\frac{1}{2}$	4.59	10.2	24 51.9	7 41.6	- 8 11.9	+0.7164	.5458	+0.063	+90	+21
118 Tauri	6	+4.47	+ 7.1	+25 3.1	21 50.5	+ 5 28.2	+0.6522	.5477	-.0058	+90	+90
125 Tauri	6	4.46	5.8	25 49.7	6 2 33.7	+10 1.8	-0.2570	.5481	.0166	+27	-30
132 Tauri	5 $\frac{1}{2}$	4.37	5.4	24 31.6	6 47.6	- 9 53.0	+1.0857	.5483	.0263	+90	+46
139 Tauri	5 $\frac{1}{2}$	+4.38	+ 3.9	+25 56.3	10 49.3	- 5 59.6	-0.5916	.5484	-.0356	+ 8	-54

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

October.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
5 Geminorum	6	+4.27 + 3.0	+24 26.7	6 16 59.4	- 0 2.1	+0.7843	.5484	-.0494	+90	+23
B. A. C. 2154	6½	4.15 + 0.3	24 41.3	7 4 43.9	+11 18.4	-.02196	.5477	.0760	+29	-34
e Geminorum	3½	4.12 - 0.5	25 14.9	7 39.3	- 9 52.2	-1.0615	.5474	.0824	-24	-65
B. A. C. 2238	6	4.04 0.9	23 44.6	11 22.1	- 6 16.9	+0.2592	.5470	.0905	+58	- 9
e Geminorum	6	4.01 2.0	24 23.2	16 5.4	- 1 43.2	-0.8902	.5464	.1006	-10	-66
44 Geminorum	6½	+3.94 - 1.7	+22 49.0	17 27.0	- 0 24.4	+0.6755	.5462	-.1035	+90	+11
d Geminorum	3½	3.84 2.9	22 12.2	8 0 14.5	+ 6 9.4	+0.5871	.5451	.1178	+83	+ 5
58 Geminorum	6	3.86 3.6	23 10.5	1 45.2	+ 7 37.0	-0.6454	.5449	.1209	+ 6	-64
63 Geminorum	5½	3.79 3.5	21 41.4	3 45.0	+ 9 32.9	+0.7143	.5445	.1250	+90	+11
85 Geminorum	5½	3.57 5.6	20 12.0	16 39.7	- 1 58.4	+0.5328	.5423	.1504	+77	- 2
B. A. C. 2683	6	+3.50 - 6.1	+19 10.9	20 54.1	+ 2 7.6	+0.9676	.5416	-.1582	+90	+23
d' Cancri	6	3.38 7.5	18 43.0	9 5 35.1	+10 31.3	+0.0174	.5401	.1739	+43	-31
d' Cancri	6	3.33 7.2	17 26.5	6 46.4	+11 40.3	+1.1663	.5399	.1759	+90	+36
g Cancri	6	3.30 8.1	18 30.0	9 26.6	- 9 44.9	-0.4343	.5395	.18 6	+18	-57
54 Cancri	6½	3.15 8.6	15 47.7	18 37.6	- 0 51.9	+0.7000	.5381	.1955	+90	+ 2
o' Cancri	6	+3.12 - 9.0	+15 47.0	21 33.0	+ 1 57.8	+0.1349	.5378	-.2000	+49	-28
o' Cancri	6	3.12 9.1	16 2.5	21 42.3	+ 2 6.7	-0.1689	.5378	.2001	+32	-44
π' Cancri	6½	3.03 9.9	15 28.8	10 4 42.3	+ 8 53.1	-1.0113	.5371	.2102	-15	-75
π' Cancri	6	3.02 10.1	15 26.4	6 4.0	+10 12.1	-1.2557	.5370	.2121	-37	-75
ξ Leonis	6	2.85 10.3	11 49.9	14 3.0	- 6 4.4	+0.7787	.5364	.2225	+90	+ 4
o Leonis	3½	+2.78 -10.5	+10 26.3	18 26.5	- 1 49.4	+1.2351	.5363	-.2277	+90	+36
18 Leonis	6	2.79 11.2	12 21.8	20 53.9	+ 0 33.2	-1.3256	.5363	.2305	-45	-78
B. A. C. 3345	6	2.78 11.2	11 59.1	21 27.4	+ 1 5.6	-1.0617	.5363	.2312	-18	-78
B. A. C. 3398	6	2.68 11.0	9 30.1	11 1 42.7	+ 5 12.5	+0.5154	.5363	.2340	+74	-12
B. A. C. 3407	6	2.67 11.0	8 53.2	2 31.0	+ 5 59.3	+0.9607	.5363	.2366	+90	+13
π Leonis	5	+2.65 -11.2	+ 8 37.2	3 30.8	+ 6 57.1	+0.9988	.5364	-.2375	+90	+16
B. A. C. 3529	6	2.56 11.8	7 2.2	13 10.4	- 7 42.0	+0.2857	.5371	.2463	+58	-25
43 Leonis	6	2.54 12.0	7 9.2	14 20.5	- 6 34.2	-0.1226	.5373	.2473	+35	-46
34 Sextantis	6	2.43 12.3	4 12.7	23 38.3	+ 2 25.4	+0.5500	.5387	.2536	+76	-12
35 Sext., mult.	6	2.44 12.6	5 22.7	23 57.9	+ 2 44.4	-0.7204	.5388	.2538	+ 4	-84
36 Sextantis	6	+2.41 -12.2	3 7.2	19 0 50.2	+ 3 35.0	+1.3552	.5390	-.2543	+90	+47
ρ' Leonis	6	2.33 13.0	2 36.5	11 3.2	-10 32.1	-0.7516	.5415	.2590	+ 2	-82
ρ' Leonis	5	2.30 12.9	+ 0 35.1	14 14.1	- 7 27.5	+0.4661	.5425	.2599	+70	-17
Venus		- 1 50.6		22 6.0	+ 0 8.7	+0.0640	.5279	.2724	+88	+ 8
B. A. C. 4923	6	+2.37 -13.6	-20 52.2	16 12 52.8	+11 43.9	-0.1777	.5978	-.1584	+19	-52
B. A. C. 5023	6	2.45 13.2	21 57.3	20 6.6	- 5 20.1	-0.1910	.6015	.1400	+17	-50
42 Libræ	5½	2.57 12.6	23 25.6	17 5 3.1	+ 3 14.1	+0.1160	.6050	.1153	+31	-35
B. A. C. 5197	6	2.60 12.5	24 20.2	7 5.4	+ 5 12.2	+0.7834	.6057	.1095	+66	+ 3
A' Scorp., mult.	5	+2.67 -12.6	-24 58.1	9 58.9	+ 7 57.5	+1.1031	.6066	-.1012	+65	+28
B. A. C. 5253	6	2.66 12.4	24 10.4	10 6.1	+ 8 4.4	+0.3079	.6066	.1009	+40	-24
B. A. C. 5254	6	2.65 12.2	23 37.2	10 7.5	+ 8 5.7	-0.2418	.6066	.1006	+11	-56
B. A. C. 5255	6	2.68 12.5	25 3.2	10 12.1	+ 8 10.1	+1.1655	.6066	.1006	+65	+34
3 Scorp'ii	6	+2.68 -12.4	-24 53.3	10 22.3	+ 8 19.9	+0.9865	.6067	-.1000	+65	+18
B. A. C. 5286	6½	2.69 12.2	24 29.6	11 50.0	+ 9 43.9	+0.4525	.6070	.0956	+48	-16
B. A. C. 5335	6½	2.70 11.6	23 17.0	14 38.3	-11 33.2	-0.9991	.6076	.0873	-34	-90
B. A. C. 5354	6½	2.71 11.5	23 22.3	15 36.5	-10 39.2	-0.9947	.6078	.0846	-34	-90
19 Scorp'ii	6	+2.78 -11.0	-23 52.7	19 59.4	- 6 27.4	-0.8366	.6085	-.0713	-25	-90
σ Scorp'ii	3½	2.81 11.2	25 18.2	20 10.1	- 6 17.1	+0.5623	.6085	.0707	+54	-10
α Scorp., mult.	1½	2.86 11.0	26 9.0	23 10.8	- 3 24.0	+1.2167	.6088	.0615	+64	+42
22 Scorp'ii	5	+2.84 -10.7	-24 51.0	23 30.0	- 3 5.7	-0.1060	.6088	-.0606	+14	-48

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

October.

Star's—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
25 Scorpii	6	+2.94 - 9.8	-25° 18.7	18 5 37.5	+ 2 46.2	+0.0400	.6087	-.0415	+20 -39	
18 Ophiuchi	6	2.94 9.4	24 25.7	6 42.3	+ 3 48.2	-0.8818	.6085	.0384	-30 -90	
B. A. C. 5641	6½	2.96 9.2	24 37.6	7 17.9	+ 4 22.3	-0.7074	.6085	.0366	-20 -90	
B. A. C. 5709	6	3.02 8.8	24 54.7	10 28.1	+ 7 24.5	-0.5243	.6080	.0266	-11 -78	
26 Ophiuchi	6	3.02 8.8	24 48.3	10 32.3	+ 7 28.5	-0.6313	.6080	.0263	-17 -90	
A¹ Ophiuchi	5½	+3.13 - 8.3	-26 25.5	16 9.4	-11 8.7	+0.8849	.6066	-.0090	+64 +11	
A² Ophiuchi	6	3.13 8.3	26 25.4	16 9.6	-11 8.4	+0.8839	.6066	.0090	+64 +11	
38 Ophiuchi	6½	3.14 8.1	26 29.7	16 59.1	-10 21.1	+0.9491	.6064	.0065	+64 +16	
θ Ophiuchi	3½	3.13 7.3	24 52.7	18 38.1	- 8 46.2	-0.6728	.6059	-.0013	-21 -90	
B. A. C. 5909	6½	3.21 7.1	-26 10.6	22 13.9	- 5 19.5	+0.6413	.6045	+0.0097	+56 - 5	
63 Ophiuchi	6½	+3.31 - 5.0	-24 51.8	19 6 57.8	+ 3 2.7	-0.4776	.6004	+0.0358	- 7 -75	
7 Sagittarii	6	3.35 4.1	24 16.9	9 59.3	+ 5 56.7	-0.9432	.5988	.0446	-34 -90	
9 Sagittarii	4½	3.37 3.9	24 21.7	10 22.6	+ 6 19.0	-0.8439	.5986	.0457	-27 -90	
B. A. C. 6217	6½	3.47 2.9	24 58.3	17 8.2	-11 11.8	+0.1444	.5943	.0649	+28 -33	
λ Sagittarii	3	3.52 2.5	25 29.3	19 37.1	- 8 49.0	+0.8373	.5927	.0718	+65 + 7	
24 Sagittarii	6	+3.52 - 1.6	-24 7.3	21 57.1	- 6 34.7	-0.3722	.5910	+0.0781	+ 2 -65	
B. A. C. 6343	6	3.53 1.0	23 36.4	23 46.3	- 4 49.8	-0.7473	.5897	.0829	-18 -90	
26 Sagittarii	6	3.55 0.9	23 56.7	20 1 4.8	- 3 34.4	-0.2941	.5888	.0863	+ 7 -60	
B. A. C. 6369	6	3.60 - 1.1	25 8.1	2 13.6	- 2 28.4	+1.0170	.5879	.0895	+65 +21	
ν¹ Sagittarii	5	3.58 + 0.5	22 53.5	5 58.8	+ 1 8.0	-0.9112	.5849	.0991	-26 -90	
ν² Sagittarii	5	+3.58 + 0.5	-22 49.2	6 21.2	+ 1 29.5	-0.9473	.5846	+1.001	-29 -90	
B. A. C. 6448	6	3.61 0.6	23 19.5	6 42.5	+ 1 49.9	-0.3983	.5844	.1009	+ 3 -67	
B. A. C. 6485	6½	3.62 1.3	22 51.7	8 57.9	+ 4 0.1	-0.6350	.5825	.1067	- 9 -89	
B. A. C. 6524	6½	3.65 1.8	22 40.9	11 7.4	+ 6 4.7	-0.5855	.5807	.1121	- 6 -83	
B. A. C. 6561	6	3.66 2.6	21 51.4	13 22.2	+ 8 14.2	-1.1719	.5789	.1173	-45 -90	
B. A. C. 6607	6	+3.72 + 3.1	-22 37.6	16 42.0	+11 26.5	+0.0182	.5761	+1.249	+27 -40	
50 Sagittarii	6	3.73 3.6	22 0.8	19 3.6	-10 17.3	-0.3089	.5740	.1302	+10 -61	
B. A. C. 6671	6	3.75 4.3	21 33.7	20 58.1	- 8 27.1	-0.5213	.5724	.1345	0 -77	
f Sagittarii	5	3.79 6.2	20 2.9	21 3 31.1	- 2 8.6	-1.1550	.5719	.1483	-39 -90	
σ Capricorni	5½	3.93 9.4	19 29.5	17 53.4	+11 43.0	+0.5919	.5540	.1747	+66 - 9	
π Capricorni	5	+3.94 +10.4	-18 36.2	21 27.2	- 8 50.7	+0.3009	.5509	+1.806	+49 -25	
ρ Capri., mult.	5	3.94 10.7	18 12.6	22 9.3	- 8 10.0	+0.0171	.5503	.1817	+33 -41	
B. A. C. 7043	6½	3.93 10.8	17 49.8	22 12.9	- 8 6.6	-0.3677	.5502	.1818	+13 -63	
B. A. C. 7053	5½	3.96 10.6	18 58.8	22 35.9	- 7 44.3	+0.9018	.5499	.1823	+71 + 9	
ο Capri., mult.	5½	+3.96 +10.5	-18 58.7	22 36.4	- 7 43.8	+0.9010	.5499	+1.823	+71 + 9	
B. A. C. 7097	6	3.94 11.7	16 56.3	29 1 11.9	- 5 13.7	-0.7506	.5477	.1861	- 7 -90	
ν Capricorni	5½	4.00 11.6	18 33.6	3 14.1	+ 3 15.5	+1.3271	.5460	.1893	+72 +52	
B. A. C. 7145	6½	3.95 12.3	16 33.0	3 30.0	- 3 0.2	-0.7235	.5458	.1896	- 5 -90	
B. A. C. 7263	6	+4.02 +13.9	-16 29.6	11 26.6	+ 4 40.5	+0.7660	.5393	+2.004	+70 0	
18 Aquarii	6	4.06 17.1	13 23.4	23 0 10.1	- 7 0.5	+0.1442	.5300	.2146	+45 -34	
ε Capricorni	6	4.08 20.0	9 49.7	11 6.7	+ 3 35.6	-1.2320	.5230	.2243	-35 -90	
λ Capricorni	5½	4.12 19.5	11 55.1	11 12.8	+ 3 41.5	-1.0127	.5229	.2244	+78 +15	
B. A. C. 7620	6	+4.12 +20.3	-10 52.4	14 46.7	+ 7 8.9	+0.7072	.5209	+2.270	+79 - 4	
θ Aquarii	4½	4.18 22.6	8 22.7	24 2 39.2	- 5 19.9	+0.7870	.5149	.2340	+72 0	
ρ Aquarii	5½	4.19 22.7	8 25.3	4 24.0	- 3 38.2	+1.2434	.5141	.2348	+82 +33	
κ Aquarii	5	4.20 24.9	4 50.7	13 36.1	+ 5 17.7	-0.4180	.5103	.2383	+19 -67	
B. A. C. 8152	6½	+4.32 +28.1	- 0 22.0	25 13 59.9	+ 4 59.6	+0.6063	.5044	+2.409	+81 -10	
γ Piscium	4½	4.33 28.4	+ 0 36.1	15 50.1	+ 6 46.7	-0.0018	.5041	.2408	+42 -42	
κ Piscium	6	4.33 28.4	0 28.0	16 0.3	+ 6 56.7	-0.1862	.5040	.2407	+52 -32	
15 Piscium	6½	+4.37 +28.6	+ 0 39.2	20 27.1	+11 15.9	+1.0532	.5037	+2.400	+90 +17	

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

October.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
16 Piscium	6	+4.36 +28.7	+ 1 26.3	25 20 57.0	+11 45.0	+0.3169	.5036	+2400	+60	-2°
19 Piscium	6	4.40 29.4	2 49.4	26 2 21.0	- 7 0.1	+0.1012	.5035	.2387	+47	-36
36 Piscium	6	4.48 30.6	7 34.6	18 38.5	+ 8 50.0	-1.2546	.5046	.2325	-34	-83
d Piscium	5.4	4.50 30.6	7 31.6	20 48.6	+10 56.5	-0.6969	.5048	.2313	+ 5	-82
45 Piscium	6	4.53 30.5	7 1.8	23 33.1	-10 23.7	+0.4790	.5052	.2207	+71	-15
75 Piscium	6	+4.70 +30.6	+12 19.0	27 21 19.2	+10 45.1	-0.4990	.5099	+2135	+15	-67
$\eta$ Piscium	3.4	4.81 29.9	14 43.8	28 10 21.3	- 0 35.1	-0.4653	.5140	.2007	+17	-63
101 Piscium	6	4.82 29.7	14 3.0	12 35.4	+ 1 34.7	+0.7313	.5147	.1980	+90	+ 3
105 Piscium	6	4.85 29.5	15 48.0	14 35.3	+ 3 31.1	-0.8098	.5154	.1957	- 3	-75
3 Arietis	6.4	4.88 29.3	16 48.8	18 8.1	+ 6 57.6	-1.2468	.5166	.1914	-37	-74
4 Arietis	6	+4.88 +29.3	+16 21.7	18 58.7	+ 7 45.9	-0.5879	.5169	+1904	+10	-69
$\epsilon$ Arietis	6	4.93 28.7	17 14.0	23 38.6	-11 41.7	-0.6771	.5186	.1846	+ 5	-72
B. A. C. 632	6	4.96 28.4	17 40.7	29 2 52.7	- 8 33.4	-0.5812	.5199	.1803	+10	-67
$\theta$ Arietis	5.4	5.04 27.4	19 20.9	10 7.7	- 1 31.5	-1.1631	.5229	.1701	-30	-71
26 Arietis	6	5 07 26.5	19 19.5	16 22.3	+ 4 31.7	-0.1039	.5255	.1608	+36	-37
B. A. C. 782	6.4	+5.06 +26.4	+18 21.2	29 17 51.6	+ 5 58.3	+1.2123	.5261	+1585	+90	+42
$\mu$ Arietis	5.4	5.10 25.7	19 30.1	22 10.4	+10 9.1	+0.6059	.5279	.1516	+84	+ 2
47 Arietis	6	5.15 24.5	20 11.3	30 5 50.8	- 6 25.0	+0.9570	.5310	.1387	+90	+25
$\epsilon$ Arietis	4.4	5.17 24.4	20 51.7	6 23.9	- 5 52.9	+0.2855	.5312	.1379	+59	-14
66 Arietis	6.4	5.27 21.5	22 23.5	20 26.1	+ 7 42.5	+0.3431	.5365	.1122	+63	- 8
7 Tauri, <i>mult.</i>	6	+5.33 +20.8	+24 3.8	23 15.3	+10 26.3	-1.2061	.5376	+1068	-39	-66
9 Tauri	6	5.29 20.7	22 48.9	31 0 26.7	+11 37.4	+0.3104	.5380	.1045	+61	- 9
$\phi$ Pleiadum	5.4	5.33 19.7	23 54.8	4 9.6	- 8 48.9	-0.5395	.5392	.0972	+11	-55
$\epsilon$ Pleiadum	4	5.33 19.7	23 44.2	4 11.8	- 8 46.8	-0.3403	.5392	.0972	+23	-43
$\omega$ Pleiadum	7	5.35 19.6	24 27.8	4 19.0	- 8 39.7	-1.1353	.5393	.0968	-31	-66
$\epsilon$ Pleiadum	5	+5.34 +19.6	+24 5.5	4 20.7	- 8 38.1	-0.7201	.5393	+0.0968	+ 1	-66
$\epsilon$ Pleiadum	5	5.34 19.5	23 59.6	4 38.3	- 8 21.1	-0.5830	.5394	.0962	+ 9	-58
$\delta$ Pleiadum	5	5.32 19.6	23 34.5	4 53.1	- 8 6.8	-0.0945	.5395	.0958	+36	-29
$\eta$ Tauri	3	5.32 19.5	23 44.1	5 25.6	- 7 35.4	-0.2202	.5397	.0946	+29	-36
29 Pleiadum	6.4	+5.34 +19.4	+23 58.6	5 54.0	- 7 7.9	-0.4444	.5398	+0.0938	+17	-49
$f$ Pleiadum	4	5.33 19.3	23 41.2	6 13.0	- 6 49.5	-0.0930	.5399	.0930	+36	-28
$\lambda$ Pleiadum	5.4	5.33 19.3	23 46.2	6 13.6	- 6 48.9	-0.1849	.5399	.0930	+31	-34
33 Tauri	6	5.31 18.6	22 49.7	9 56.8	- 3 13.0	+1.1954	.5411	.0855	+90	+50
36 Tauri	6	+5.35 +17.6	+23 46.6	13 20.2	+ 0 3.7	+0.4180	.5420	+0.0785	+69	0
$\chi^1$ Tauri	5.4	5.40 15.3	25 20.8	21 46.1	+ 8 12.9	-0.7391	.5442	.0607	- 1	-65
$\chi^2$ Tauri	5.4	5.40 15.3	25 20.9	21 46.3	+ 8 13.1	-0.7410	.5442	.0607	- 1	-65
62 Tauri, <i>mult.</i>	6	+5.36 +15.5	+24 1.3	22 27.3	+ 8 52.7	+0.7731	.5444	+0.0592	+90	+21

November.

B. A. C. 1518	6	+5.34 +11.7	+24 23.9	11 13 17.3	- 0 47.1	+0.9917	.5470	+0.0267	+90	+38
$\kappa$ Tauri	5.4	5.36 11.4	24 51.9	14 8.5	+ 0 2.5	+0.4963	.5472	+0.0247	+76	+ 9
118 Tauri	6	5.29 7.6	25 3.1	2 20.8	-10 13.7	+0.4126	.5480	-.0073	+69	+ 6
125 Tauri	6	5.29 5.9	25 49.7	9 5.6	- 5 38.8	-0.5069	.5480	.0179	+13	-46
132 Tauri	5.4	5.22 5.0	24 31.6	13 21.4	- 1 31.7	+0.8371	.5480	.0275	+90	+28
139 Tauri	5.4	+5.24 + 3.6	+25 56.3	17 25.0	+ 2 23.7	-0.8533	.5479	-0.0368	- 9	-64
5 Geminorum	6	5.13 + 2.2	24 26.7	23 38.4	+ 8 24.5	+0.5230	.5473	.0506	+77	+ 8
B. A. C. 2154	6.4	5.04 - 1.0	24 41.3	11 31.1	- 4 6.8	-0.4986	.5452	.0765	+13	-51
B. A. C. 2238	6	4.94 2.4	23 44.6	18 14.9	+ 2 23.5	-0.0222	.5438	.0907	+40	-24
$\omega$ Geminorum	6	+4.91 - 3.9	+24 23.1	23 2.7	+ 7 1.7	-1.1847	.5428	-1.007	-36	-66

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

November.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$								
44 Geminorum	6 $\frac{1}{2}$	+4.84	- 3.7	+22 49.0	d h m	h m	+0.3928	.5425	-.1036	+67	- 4
$\delta$ Gem., <i>mult.</i>	3 $\frac{1}{2}$	4.74	5.3	22 12.1	7 20.4	- 8 57.2	+0.2993	.5410	.1175	+60	-10
58 Geminorum	6	4.75	6.0	23 10.5	8 52.7	- 7 27.9	-0.0453	.5406	.1205	-14	-67
63 Gem., <i>mult.</i>	5 $\frac{1}{2}$	4.68	6.0	21 41.4	10 54.8	- 5 29.6	+0.4258	.5401	.1244	+69	- 5
85 Geminorum	5 $\frac{1}{2}$	4.48	8.5	20 12.0	5 0 6.2	+ 7 15.8	+0.2376	.5368	.1490	+56	-17
B. A. C. 2683	6	+4.41	- 9.2	+19 10.9	4 26.7	+11 27.9	+0.6764	.5357	-.1567	+90	+ 5
$\delta^1$ Cancri	6	4.26	10.8	18 43.0	13 21.0	- 3 55.1	-0.2857	.5335	.1716	+26	-48
$\delta^2$ Cancri	6	4.21	10.6	17 26.4	14 34.1	- 2 44.4	+0.8772	.5332	.1736	+90	+15
$\theta$ Cancri	6	4.21	11.5	18 20.9	17 18.6	- 0 5.1	-0.7430	.5325	.1779	0	-71
54 Cancri	6 $\frac{1}{2}$	4.02	12.4	15 47.7	6 2 45.2	+ 9 3.4	+0.4078	.5306	.1923	+66	-13
$\alpha^1$ Cancri	6	+3.98	-13.0	+15 46.9	5 45.7	+11 58.2	-0.1640	.5301	-.1965	+33	-44
$\alpha^2$ Cancri	6	3.98	13.0	16 2.5	5 55.3	-11 52.5	-0.4717	.5301	.1968	+16	-62
$\pi^1$ Cancri	6 $\frac{1}{2}$	3.86	14.0	15 28.7	13 8.0	- 4 53.4	-1.3222	.5289	.2064	-47	-75
$\xi$ Leonis	6	3.66	14.4	11 49.8	22 46.1	+ 4 26.5	+0.4984	.5278	.2181	+73	-12
$\alpha$ Leonis	3 $\frac{1}{2}$	3.57	14.7	10 26.3	7 3 18.0	+ 8 49.9	+0.9654	.5276	.2220	+90	+15
B. A. C. 3345	6	+3.56	-15.6	+11 59.0	6 24.7	+11 50.8	-1.3580	.5275	-.2294	-51	-78
B. A. C. 3398	6	3.48	15.2	9 30.1	10 48.1	- 7 54.1	+0.2431	.5274	.2307	+55	-27
B. A. C. 3407	6	3.46	15.2	8 53.2	11 37.9	- 7 5.8	+0.6958	.5275	.2316	+90	- 3
$\pi$ Leonis	5	3.44	15.3	8 37.2	12 39.7	- 6 6.0	+0.7353	.5275	.2325	+90	- 1
B. A. C. 3529	6	3.30	16.0	7 2.1	22 37.7	+ 3 33.3	+0.0254	.5282	.2410	+43	-39
43 Leonis	6	+3.30	-16.1	+ 7 9.1	23 50.0	+ 4 43.4	-0.3870	.5284	-.2419	+22	-63
34 Sextantis	6	3.15	16.2	4 12.6	8 9 25.2	- 9 59.6	+0.3108	.5304	.2484	+59	-25
35 Sext., <i>mult.</i>	6	3.15	16.6	5 22.7	9 45.3	- 9 40.2	-0.9767	.5304	.2485	-12	-85
36 Sextantis	6	3.12	16.1	3 7.2	10 39.2	- 8 48.0	+1.1288	.5306	.2488	+90	+24
$\rho^3$ Leonis	6	3.00	16.8	2 26.4	21 10.1	+ 1 22.8	-0.9863	.5335	.2532	-12	-88
$\rho^5$ Leonis	5	+2.95	-16.4	+ 0 35.0	9 0 26.3	+ 4 32.7	+0.2539	.5347	-.2542	+56	-28
$\epsilon$ Leonis	5	2.85	16.1	- 2 20.4	8 18.2	-11 50.7	+1.2238	.5378	.2556	+88	+31
B. A. C. 4006	6	2.75	16.1	4 39.9	18 0.4	- 2 27.6	+1.0907	.5427	.2553	+96	+20
B. A. C. 4201	6	2.62	16.1	8 0.6	10 10 48.8	-10 13.3	+0.1910	.5532	.2495	+50	-31
$\eta$ Virginis	6	2.60	16.1	8 47.3	13 24.1	- 7 43.4	+0.3245	.5551	.2479	+58	-24
B. A. C. 4212	6 $\frac{1}{2}$	+2.56	-16.7	- 9 41.0	21 7.4	- 0 16.3	-0.6763	.5608	-.2420	+ 3	-89
69 Virginis	5 $\frac{1}{2}$	2.50	15.6	15 21.1	11 12 26.4	- 9 30.7	+1.1811	.5732	.2249	+75	-29
75 Virginis	6	2.50	15.1	14 44.7	14 41.1	- 7 21.0	+0.2465	.5750	.2219	+49	-29
A $\delta$ Ophiuchi	5 $\frac{1}{2}$	2.95	7.1	26 25.5	15 1 59.3	+ 0 29.3	+1.0297	.6176	.0072	+64	+23
A $\delta$ Ophiuchi	6	+2.95	- 7.1	-26 25.4	1 59.5	+ 0 29.5	+1.0287	.6176	-.0072	+64	+23
39 Ophiuchi	6 $\frac{1}{2}$	2.96	7.0	26 29.8	2 47.5	+ 1 15.4	+1.0950	.6174	.0046	+64	+29
39 Ophi., <i>mult.</i>	6	2.94	6.6	24 9.3	2 58.1	+ 1 25.5	-1.2086	.6174	-.0039	-58	-90
$\theta$ Ophiuchi	3 $\frac{1}{2}$	2.95	6.3	24 52.7	4 23.3	+ 2 47.1	-0.4995	.6170	+0.006	-12	-76
B. A. C. 5009	6 $\frac{1}{2}$	+3.02	- 6.0	-26 10.6	7 52.4	+ 6 6.8	+0.8007	.6159	+0.117	+64	+05
63 Ophiuchi	6 $\frac{1}{2}$	3.07	4.0	24 51.8	16 19.1	- 9 48.1	-0.2844	.6121	.0384	+ 3	-59
4 Sagittarii	5	3.06	3.5	23 48.2	18 8.0	- 8 3.9	-1.2595	.6111	.0439	-62	-90
7 Sagittarii	6	3.12	3.3	24 16.9	19 14.7	- 7 0.0	-0.7367	.6105	.0472	-21	-90
9 Sagittarii	4 $\frac{1}{2}$	+3.10	- 3.2	-24 21.7	19 37.2	- 6 38.4	-0.6356	.6102	+0.084	-15	-90
B. A. C. 6161	6	3.10	2.6	23 43.5	22 31.8	- 3 51.3	-1.1189	.6083	.0572	-46	-90
B. A. C. 6217	6 $\frac{1}{2}$	3.17	2.1	24 58.3	16 2 9.1	- 0 23.1	+0.3452	.6059	.0678	+40	-22
$\lambda$ Sagittarii	3	3.21	1.7	25 29.3	4 33.0	+ 1 54.7	+1.0306	.6041	.0748	+65	+22
24 Sagittarii	6	+3.21	- 1.0	-24 7.2	6 48.0	+ 4 4.3	-0.1548	.6025	+0.010	+13	-51
B. A. C. 6343	6	3.20	0.3	23 36.4	8 33.7	+ 5 45.4	-0.5207	.6011	.0661	- 5	-77
26 Sagittarii	6	3.23	0.2	23 56.7	9 49.5	+ 6 58.2	-0.0730	.6002	.0698	+18	-46
B. A. C. 6369	6	+3.27	- 0.4	-25 8.1	10 56.0	+ 8 1.9	+1.2176	.5993	+0.027	+65	+42

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

November.

STAR'S—				AT CONJUNCTION IN R. A.							Limiting Parallels	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N'n.	S'n.	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				N'n.	S'n.	
$\nu^1$ Sagittarii	5	+3.25	+ 1.1	-22° 53.5	16 14 33.5	+11 30.5	-0.6724	.5962	+1.023	-12	-00	
$\nu^2$ Sagittarii	5	3.25	1.1	22 49.2	14 55.2	+11 51.3	-0.7069	.5959	.1034	-14	-90	
B. A. C. 6448	6	3.27	1.0	23 19.4	15 15.8	-11 48.8	-0.1667	.5956	.1042	+15	-51	
B. A. C. 6485	6 $\frac{1}{2}$	3.28	1.6	22 51.7	17 26.6	- 9 43.4	-0.3965	.5938	.1099	+ 4	-67	
$\alpha$ Sagittarii	4	3.27	2.1	21 55.0	18 39.2	- 8 33.9	-1.2123	.5927	.1129	-50	-90	
B. A. C. 6524	6 $\frac{1}{2}$	+3.30	+ 2.1	-22 40.8	19 31.8	- 7 43.1	-0.3445	.5919	+1.152	+ 7	-63	
B. A. C. 6561	6	3.30	2.8	21 51.4	21 42.1	- 5 38.1	-0.9181	.5900	.1205	-25	-90	
B. A. C. 6607	6	3.36	3.1	22 37.6	17 0 55.2	- 2 32.5	+0.2566	.5867	.1283	+40	-27	
50 Sagittarii	6	3.37	3.7	22 0.8	3 12.1	- 0 21.0	-0.0622	.5846	.1335	+23	-45	
B. A. C. 6671	6	3.37	4.2	21 33.7	5 3.0	+ 1 25.6	-0.2686	.5826	.1376	+13	-58	
$f$ Sagittarii	5	+3.39	+ 6.1	-20 2.9	11 23.3	+ 7 31.3	-0.8845	.5766	+1.514	-19	-90	
57 Sagittarii	5 $\frac{1}{2}$	3.40	6.8	19 20.9	13 48.5	+ 9 51.1	-1.2241	.5742	.1563	-46	-90	
$\sigma$ Capricorni	5 $\frac{1}{2}$	3.53	8.8	19 29.5	18 1 19.4	- 3 3.4	+0.8494	.5626	.1779	+71	+ 6	
$\pi$ Capricorni	5	3.54	9.8	18 36.3	4 47.1	+ 0 16.9	+0.5657	.5592	.1835	+65	-11	
$\rho$ Capri, mult.	5	3.54	10.0	18 12.6	5 28.1	+ 0 56.4	+0.2864	.5586	.1846	+48	-26	
B. A. C. 7043	6 $\frac{1}{2}$	+3.53	+10.1	-17 49.8	5 31.6	+ 0 59.8	-0.0924	.5585	+1.848	+28	-47	
B. A. C. 7053	5 $\frac{1}{2}$	3.57	12.2	18 58.9	5 53.9	+ 1 21.3	+1.1585	.5582	.1852	+71	+29	
$\alpha$ Capri., mult.	5 $\frac{1}{2}$	3.57	12.2	18 58.7	5 54.4	+ 1 21.8	+1.1577	.5582	.1852	+71	+29	
B. A. C. 7097	6	3.54	11.0	16 56.3	8 25.6	+ 3 47.7	-0.4679	.5556	.1893	+ 9	-71	
B. A. C. 7145	6 $\frac{1}{2}$	3.56	11.6	16 33.1	10 40.1	+ 5 57.5	-0.4397	.5536	.1925	+11	-60	
B. A. C. 7263	6	+3.63	+12.9	-16 29.6	18 24.5	-10 34.0	+1.0337	.5464	+2.029	+74	+18	
9 Aquarii	6	3.59	14.0	13 59.9	20 2.7	- 8 59.1	-1.2207	.5448	.2050	-38	-90	
18 Aquarii	6	3.68	16.0	13 23.5	19 6 50.8	+ 1 27.8	+0.4242	.5355	.2166	+61	-19	
$\epsilon^1$ Capricorni	4 $\frac{1}{2}$	3.70	18.7	9 37.9	16 57.6	+11 15.2	-1.2532	.5276	.2251	-41	-90	
$\epsilon^2$ Capricorni	6	3.70	18.8	9 49.7	17 34.8	+11 51.2	-0.9374	.5272	.2256	-12	-90	
$\lambda$ Capricorni	5 $\frac{1}{2}$	+3.74	+18.1	-11 55.1	17 40.9	+11 57.1	+1.2844	.5271	+2.256	+78	+39	
B. A. C. 7620	6	3.76	18.8	10 52.4	21 11.2	- 8 39.1	+0.9819	.5247	.2280	+79	+13	
9 Aquarii	4 $\frac{1}{2}$	3.82	21.2	8 22.8	20 8 53.3	+ 2 41.6	+1.0580	.5174	.2343	+82	+18	
51 Aquarii	6	2.82	22.7	5 26.5	12 39.0	+ 6 20.5	-1.1800	.5154	.2359	-28	-90	
$\kappa$ Aquarii	5	3.88	23.6	4 50.7	19 42.8	-10 48.2	-0.1449	.5120	.2381	+33	-50	
B. A. C. 8152	6 $\frac{1}{2}$	+4.06	+26.9	- 0 22.0	21 19 57.4	-11 15.4	+0.8494	.5045	+2.395	+90	+ 4	
$\kappa$ Piscium	4 $\frac{1}{2}$	4.07	27.4	+ 0 36.0	21 47.3	- 9 28.6	+0.2409	.5042	.2393	+55	-29	
9 Piscium	6	4.08	27.4	0 27.9	21 57.4	- 9 18.7	+0.4378	.5041	.2392	+67	-19	
15 Piscium	6 $\frac{1}{2}$	4.11	27.6	0 39.1	22 2 23.6	- 5 0.2	+1.2865	.5035	.2383	+90	+37	
16 Piscium	6	4.12	27.9	1 26.3	2 53.4	- 4 31.2	+0.5518	.5034	.2382	+76	-12	
19 Piscium	6	+4.16	+28.7	+ 2 49.4	8 17.0	+ 0 43.3	+0.3285	.5029	+2.367	+60	-24	
36 Piscium	6	4.32	30.3	7 34.6	23 0 34.9	- 7 26.3	-1.0532	.5029	.2300	-17	-83	
$\delta$ Piscium	5 $\frac{1}{2}$	4.34	30.2	7 31.6	2 45.2	- 5 19.6	-0.5001	.5031	.2288	+15	-70	
45 Piscium	6	4.37	30.1	7 1.8	5 30.0	- 2 39.5	+0.6696	.5034	.2272	+88	- 5	
75 Piscium	6	4.63	30.8	12 19.0	24 3 19.9	- 5 26.7	-0.3514	.5079	.2107	+23	-58	
$\eta$ Piscium	3 $\frac{1}{2}$	+4.81	+30.5	+14 43.8	16 24.6	+ 7 15.3	-0.3453	.5122	+1.978	+23	-55	
101 Piscium	6	4.82	30.1	14 3.0	18 39.1	+ 9 25.9	+0.8472	.5130	.1952	+90	+10	
105 Piscium	6	4.87	30.3	15 48.0	20 39.4	+11 22.7	-0.6908	.5138	.1930	+ 4	-74	
3 Arietis	6 $\frac{1}{2}$	4.91	30.2	16 48.8	25 0 12.9	- 9 10.1	-1.1445	.5153	.1827	-27	-73	
4 Arietis	6	4.92	30.0	16 21.7	1 2.8	- 8 21.7	-0.4872	.5156	.1878	+15	-62	
$\epsilon$ Arietis	6	+4.98	+29.6	+17 14.1	5 44.5	- 3 48.3	-0.5865	.5175	+1.819	+10	-68	
B. A. C. 632	6	5.04	29.4	17 40.8	8 59.0	- 0 39.6	-0.4372	.5189	.1778	+14	-62	
15 Arietis	6	5.10	29.1	18 56.2	12 28.0	+ 2 43.1	-1.2812	.5204	.1731	-44	-71	
9 Arietis	5 $\frac{1}{2}$	5.15	28.7	19 20.9	16 15.1	+ 6 23.3	-1.0955	.5220	.1678	-24	-71	
26 Arietis	6	5.22	27.7	19 19.5	22 30.4	-11 32.8	-0.0491	.5248	.1587	+29	-33	
B. A. C. 782	6 $\frac{1}{2}$	+5.22	+37.4	+18 21.2	23 59.9	-10 6.0	+1.2650	.5255	+1.564	+90	+49	



**ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.**

**November.**

STAR'S—					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>z'</i>	<i>y'</i>	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
<i>u</i> Arietis	5½	+5.28	+26.9	+19 30.1	26 4 19.0	- 5 54.8	+0.6484	.5275	+1493	+59	+ 4
47 Arietis	6	5.39	25.6	20 11.4	11 59.7	+ 1 31.4	+0.9838	.5309	.1369	+90	+26
<i>ε</i> Arietis, <i>mult</i>	4½	5.41	25.5	20 51.7	12 32.9	+ 2 3.6	+0.3108	.5312	.1358	+60	-12
66 Arietis	6½	5.59	22.8	22 23.5	27 2 34.9	- 8 21.2	+0.3386	.5372	.1103	+63	- 8
7 Tauri, <i>mult.</i>	6	5.66	22.4	24 3.8	5 23.9	- 5 37.7	-1.2170	.5384	.1050	-41	-66
9 Tauri	6	+5.63	+21.9	+22 48.9	6 37.3	- 4 26.6	+0.2979	.5389	+1025	+60	- 9
<i>δ</i> Pleiadum	5½	5.70	21.0	23 54.8	10 17.8	- 0 53.3	-0.5595	.5403	.0954	+10	-57
<i>δ</i> Pleiadum	4	5.69	21.0	23 44.2	10 20.0	- 0 51.2	-0.3606	.5404	.0952	+21	-44
<i>m</i> Pleiadum	7	5.72	21.1	24 27.8	10 27.2	- 0 44.1	-1.1564	.5404	.0950	-34	-66
<i>ε</i> Pleiadum	5	5.71	20.9	24 5.5	10 28.9	- 0 42.5	-0.7408	.5404	.0950	- 1	-66
<i>c</i> Pleiadum	5	+5.71	+20.9	+23 59.6	10 46.5	- 0 25.5	-0.6043	.5405	+0944	+ 7	-60
<i>d</i> Pleiadum	5	5.69	20.9	23 34.5	11 1.2	- 0 11.2	-0.1161	.5406	.0938	+35	-30
<i>η</i> Tauri	3	5.70	20.7	23 44.1	11 33.6	+ 0 20.0	-0.2429	.5508	.0928	+28	-37
29 Pleiadum	6½	5.71	20.7	23 58.6	12 2.0	+ 0 47.5	-0.4680	.5410	.0918	+15	-50
<i>f</i> Pleiadum	4	5.70	20.6	23 41.2	12 21.0	+ 1 5.9	-0.1174	.5411	.0912	+35	-30
<i>λ</i> Pleiadum	5½	+5.71	+20.6	+23 46.3	12 21.6	+ 1 6.5	-0.2091	.5411	+0912	+30	-35
33 Tauri	6	5.70	19.7	22 49.7	16 4.4	+ 4 42.0	+1.1644	.5425	.0838	+90	+47
36 Tauri	6	5.76	18.8	23 46.6	19 27.4	+ 7 58.3	+0.3803	.5436	.0769	+66	- 2
<i>χ</i> Tauri	5½	5.87	16.7	25 20.8	28 3 51.0	- 7 53.8	-0.7937	.5461	.0589	- 5	-65
<i>χ</i> Tauri	8½	5.88	16.7	25 21.3	3 52.0	- 7 53.7	-0.7956	.5761	.0589	- 5	-65
62 Tauri	6	+5.84	+16.4	+24 1.3	4 33.0	- 7 14.1	+0.7178	.5462	+0575	+90	+18
B. A. C. 1518	6	5.95	12.1	24 23.9	19 20.6	+ 7 3.3	+0.9088	.5494	.0249	+90	+33
<i>k</i> Tauri	5½	5.97	11.8	24 51.9	20 11.2	+ 7 52.6	+0.4118	.5495	+0231	+68	+ 5
118 Tauri	6	5.97	7.4	25 3.1	29 10 20.5	- 2 26.9	+0.3037	.5505	-0091	+60	+ 1
125 Tauri	6	5.99	6.1	25 49.7	15 4.4	+ 2 7.4	-0.6240	.5505	.0194	+ 6	-56
132 Tauri	5½	+5.92	+ 4.8	+24 31.6	19 19.3	+ 6 13.6	+0.7136	.5503	-0293	+90	+21
139 Tauri	5½	5.97	3.5	25 56.3	23 22.3	+10 8.4	-0.9840	.5500	.0384	-19	-64
5 Geminorum	6	5.88	+ 1.6	24 26.7	30 5 34.7	- 7 51.8	+0.3835	.5492	.0521	+66	+ 1
B. A. C. 2154	6½	+5.82	- 2.0	+24 41.3	17 26.3	+ 3 35.8	-0.6572	.5472	-0779	+ 4	-62

**December.**

B. A. C. 2238	6	+5.75	- 3.7	+23 44.5	1 0 10.1	+10 6.1	-0.1899	.5456	-0921	+31	-34
44 Geminorum	6½	5.67	5.5	22 48.9	6 21.1	- 7 55.2	+0.2183	.5438	.1050	+54	-12
<i>σ</i> Gemi., <i>mult.</i>	3½	5.59	7.4	22 12.1	13 16.8	- 1 13.3	+0.1156	.5419	.1188	+48	-20
58 Geminorum	6	5.61	8.1	23 10.5	14 49.5	+ 0 16.4	-1.1355	.5414	.1218	-30	-67
63 Geminorum	5½	5.54	8.3	21 41.3	16 52.0	+ 2 14.9	+0.2383	.5407	.1257	+56	-15
85 Geminorum	5½	5.37	11.5	20 11.7	2 6 7.7	- 8 55.4	+0.0348	.5361	.1490	+44	-28
B. A. C. 2683	6	+5.28	-12.5	+19 10.8	10 30.2	- 4 41.2	+0.4714	.5347	-1574	+72	- 6
<i>ζ</i> Cancri	4½	5.20	12.9	18 0.5	14 6.4	- 1 12.0	+1.1671	.5335	.1633	+90	+38
<i>ζ</i> Cancri	7½	5.20	12.9	18 0.3	14 6.6	- 1 11.8	+1.1717	.5335	.1633	+90	+39
<i>d</i> Cancri	6	5.16	14.4	18 42.9	19 29.6	+ 4 0.9	-0.5048	.5318	.1718	+14	-61
<i>d</i> Cancri	6	5.11	14.5	17 26.4	20 43.6	+ 5 12.5	+0.6663	.5314	.1738	+90	+ 3
<i>θ</i> Cancri	6	5.11	15.2	18 29.9	23 30.1	+ 7 53.8	-0.9687	.5305	.1780	-14	-72
54 Cancri	6½	+4.91	-16.6	+15 47.6	3 9 4.4	- 6 49.9	-0.1837	.5277	-1916	+52	-25
<i>ο</i> Cancri	6	4.88	17.3	15 46.9	12 7.8	- 3 52.2	+0.3949	.5268	.1958	+20	-57
<i>ο</i> Cancri	6	4.88	17.4	16 2.4	12 17.5	- 3 42.7	-0.7052	.5268	.1959	+ 3	-74
<i>ξ</i> Leonis	6	4.56	19.3	11 49.8	4 5 27.6	-11 4.5	+0.2674	.5228	.2164	+57	-24
<i>ο</i> Leonis	3½	4.48	19.6	10 26.2	10 5.7	- 6 34.9	+0.7389	.5222	.2210	+90	+ 1
B. A. C. 3398	6	4.37	20.5	9 30.0	17 46.8	+ 0 52.2	+0.0074	.5215	.2281	+42	-30
B. A. C. 3407	6	+4.34	-20.5	+ 8 53.1	18 38.0	+ 1 41.8	+0.4659	.5214	-2288	+70	-15
<i>π</i> Leonis	5	4.33	20.5	8 37.1	19 41.3	+ 2 43.2	+0.5060	.5214	.2297	+73	-13
B. A. C. 3529	6	4.18	21.4	7 2.0	5 5 56.0	-11 20.8	-0.2118	.5211	.2374	+30	-52
43 Leonis	6	4.18	21.6	7 9.0	7 10.4	-10 8.6	-0.6294	.5211	.2382	+ 8	-80
34 Sextantis	6	4.02	21.8	4 12.5	17 3.3	- 0 33.8	+0.0821	.5220	.2437	+46	-37
35 Sext., <i>mult.</i>	6	+4.02	-22.2	+ 5 22.5	17 24.0	- 0 13.7	-1.2252	.5220	-2438	-31	-85

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

December.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
		$\alpha$	$\delta$		$d$ $h$ $m$	$h$ $m$					
36 Sextantis	6	+3.99	-21.5	+ 3 7.1	5 18 19.7	+ 0 40.3	+0.9137	.5222	-.2443	+90 + 8	
$\rho^2$ Leonis	6	3.86	21.5	0 38.6	6 3 32.9	+ 9 36.4	+1.2221	.5240	.2477	+31 +90	
$\rho^3$ Leonis	6	3.86	22.3	2 36.4	5 11.6	+11 12.1	-1.2277	.5243	.2481	-88 -31	
$\rho^4$ Leonis	5	3.80	21.9	+ 0 35.0	8 34.7	- 9 31.0	+0.0352	.5253	.2489	+40 -43	
$\epsilon$ Leonis	5	3.69	21.4	- 2 20.5	16 43.3	- 1 37.7	+1.0290	.5280	.2500	+88 +15	
B. A. C. 4006	6	+3.58	-21.1	- 4 40.0	7 2 46.6	+ 8 6.5	+0.9053	.5325	-.2493	+86 + 7	
14 Virginis	6.5	3.46	20.4	8 14.9	16 11.1	- 2 55.1	+1.2365	.5401	.2454	+82 +33	
B. A. C. 4201	6	3.42	20.5	8 0.7	20 11.8	+ 0 57.7	+0.0144	.5428	.2434	+40 -41	
$\eta$ Virginis	6	3.39	20.2	8 47.4	22 52.7	+ 3 33.2	+0.1542	.5447	.2418	+48 -33	
B. A. C. 4312	6.5	3.33	20.1	9 41.1	8 6 52.4	+11 16.8	-0.8500	.5506	.2360	- 7 -90	
69 Virginis	5.5	+3.24	-18.0	-15 21.1	22 41.8	+ 2 32.8	+1.2294	.5637	-.2196	+75 +35	
75 Virginis	6	3.22	18.3	14 44.7	9 1 0.8	+ 4 46.7	+0.1179	.5657	.2165	+42 -35	
83 Virginis	6	3.19	17.7	15 34.5	5 55.2	+ 9 30.4	-0.1002	.5701	.2096	+30 -47	
85 Virginis	6	3.19	17.7	15 9.8	6 23.0	+ 9 57.2	-0.6064	.5705	.2099	+ 4 -83	
$\delta$ Virginis	6	3.20	17.2	17 15.5	7 7.6	+10 40.1	+1.3250	.5711	.2078	+73 +50	
B. A. C. 4722	6	+3.12	-16.4	-17 38.4	18 36.9	- 2 16.6	-0.5773	.5818	-.1883	+ 2 -80	
B. A. C. 4739	6.5	3.13	16.3	18 9.5	19 54.4	- 1 2.1	-0.3049	.5829	.1859	+16 -60	
B. A. C. 4923	6	3.10	14.3	20 52.3	10 11 3.0	-10 29.4	-0.2017	.5968	.1534	+18 -53	
B. A. C. 5023	6	3.10	-13.2	21 57.3	18 17.0	- 3 33.2	-0.1811	.6026	-.1356	+17 -52	
$\alpha$ Sagittarii	4	3.21	+ 2.2	21 55.0	14 5 22.8	+ 3 58.1	-1.0977	.6011	+1.159	-39 -90	
B. A. C. 6607	6	+3.26	+ 3.5	-22 37.6	11 29.4	+ 9 49.8	+0.3642	.5958	+1.316	+46 -21	
50 Sagittarii	6	3.26	4.1	22 1.1	13 42.7	+11 57.7	+0.0570	.5939	.1369	+30 -38	
B. A. C. 6671	6	3.26	4.5	21 33.7	15 30.5	-10 18.8	-0.1488	.5923	.1412	+19 -50	
$f$ Sagittarii	5	3.26	6.0	20 2.9	21 40.2	- 4 23.7	-0.7473	.5863	.1552	-11 -90	
57 Sagittarii	5.5	3.25	6.5	19 20.9	15 0 1.1	- 2 8.2	-1.0792	.5840	.1602	-32 -90	
$\sigma$ Capricorni	5.5	+3.33	+ 8.6	-19 29.5	11 11.0	+ 8 36.4	+0.9793	.5728	+1.820	+71 +15	
$\pi$ Capricorni	5	3.34	9.4	18 36.3	14 32.3	+11 50.2	+0.7041	.5728	.1877	+72 - 3	
$\rho$ Capri., mult.	5	3.33	9.6	18 12.6	15 11.9	-11 31.7	+0.4294	.5688	.1889	+57 -18	
B. A. C. 7043	6.5	3.32	9.7	17 49.8	15 15.3	-11 28.4	+0.0711	.5687	.1890	+36 -37	
B. A. C. 7053	5.5	3.35	9.5	18 58.9	15 36.9	-11 7.6	+1.2891	.5683	.1896	+71 +45	
$\alpha$ Capri., mult.	5.5	+3.35	+ 9.5	-18 58.7	15 37.3	-11 7.1	+1.2885	.5683	+1.896	+71 +45	
B. A. C. 7097	6	3.32	10.4	16 56.3	18 3.8	- 8 46.0	-0.3100	.5659	.1935	+17 -60	
B. A. C. 7145	6.5	3.33	10.9	16 33.1	20 14.0	- 6 40.5	-0.2800	.5637	.1969	+19 -58	
B. A. C. 7263	6	3.39	12.2	16 29.6	16 3 43.5	+ 0 33.0	+1.1787	.5563	.2075	+74 +30	
9 Aquarii	6	3.34	13.0	13 59.9	5 18.5	+ 2 4.7	-1.0387	.5548	.2094	-23 -90	
18 Aquarii	6	+3.41	+15.0	-13 23.5	15 45.7	-11 49.5	+0.5893	.5452	+2.210	+72 -10	
$\epsilon^1$ Capricorni	4.5	3.42	17.3	9 37.9	17 1 33.3	- 2 21.2	-1.0854	.5368	.2294	-23 -90	
$\epsilon^2$ Capricorni	6	3.43	17.4	9 49.7	2 9.3	- 1 46.4	-0.7444	.5363	.2299	- 1 -90	
B. A. C. 7620	6	3.48	17.6	10 52.5	5 38.9	+ 1 36.5	+1.1482	.5341	.2318	+79 +25	
$\theta$ Aquarii	4.5	3.53	19.7	8 22.8	17 0.2	-11 23.7	+1.2294	.5256	.2353	+82 +32	
44 Aquarii	5.5	+3.50	+20.4	- 5 59.1	17 10.4	-11 13.7	-1.2382	.5255	+2.283	-34 -90	
51 Aquarii	6	3.53	21.0	5 26.6	20 39.5	- 7 51.2	-0.9765	.5233	.2396	-13 -90	
$\kappa$ Aquarii	5	3.59	21.9	4 50.7	18 3 31.8	- 1 11.1	+0.0460	.5193	.2415	+43 -39	
B. A. C. 8152	6.5	3.77	25.2	- 0 22.1	19 3 12.3	- 2 12.8	+1.0285	.5093	.2414	+30 +16	
$\kappa$ Piscium	4.5	3.78	25.6	+ 0 36.0	4 59.9	- 0 28.3	+0.4253	.5089	.2411	+67 -19	
9 Piscium	6	+3.78	+25.5	+ 0 27.9	5 10.0	- 0 18.5	+0.6106	.5088	+2.410	+81 - 9	
16 Piscium	6	3.83	26.2	1 26.3	10 0.3	+ 4 23.4	+0.7316	.5076	.2398	+90 - 3	
19 Piscium	6	3.89	27.0	2 49.4	15 18.1	+ 9 32.1	+0.5087	.5067	.2380	+73 -15	
36 Piscium	6	4.07	28.8	7 34.6	20 7 21.9	+ 1 8.4	-0.8712	.5054	.2303	- 6 -83	
$\delta$ Piscium	5.5	4.10	28.8	7 31.6	9 30.7	+ 3 13.5	-0.3241	.5053	.2291	+24 -58	
45 Piscium	6	+4.12	+28.6	+ 7 1.8	12 13.7	+ 5 51.9	+0.8360	.5054	+2.273	+90 + 5	
58 Piscium	5	4.27	29.9	11 19.3	23 33.3	- 7 8.0	-1.3213	.5064	.2190	-44 -79	
75 Piscium	6	4.43	29.7	12 19.0	21 9 53.0	+ 2 53.8	-0.1973	.5083	.2100	+31 -48	
$\eta$ Piscium	3.5	4.64	29.8	14 43.8	22 54.3	- 8 27.5	-0.2048	.5117	.1966	+30 -47	
101 Piscium	6	+4.66	+29.4	+14 3.0	22 1 8.1	- 6 17.2	+0.9812	.5124	+1.940	+90 +19	

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

December.

Star's—				At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1879.0. Δα Δδ	Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N'n.	S'n.
105 Piscium	6	+4.70 +29.7	+15° 48.0	<sup>d h m</sup> 22 3 8.4	<sup>h m</sup> - 4 20.7	-0.5627	.5130	+1917	+11	-68
3 Arietis	6½	4.76 29.9	16 48.8	6 41.6	- 0 53.9	-1.0100	.5143	.1874	-16	-73
4 Arietis	6	4.78 29.5	16 21.7	7 31.3	- 0 5.6	-0.3556	.5147	.1864	+22	-54
ι Arietis	6	4.86 29.3	17 14.0	12 12.6	+ 4 27.3	-0.4601	.5163	.1805	+17	-60
B. A. C. 632	6	4.92 29.0	17 40.8	15 27.0	+ 7 35.9	-0.3745	.5176	.1762	+21	-54
15 Arietis	6	+4.99 +29.0	+18 56.2	18 55.9	+10 58.6	-1.1609	.5189	+1716	-30	-71
θ Arietis	5½	5.06 28.7	19 20.9	22 42.9	- 9 21.3	-0.9797	.5205	.1660	-15	-71
26 Arietis	6	5.15 27.7	19 19.5	<sup>23</sup> 4 58.4	- 3 17.2	+0.0570	.5232	.1570	+45	-28
μ Arietis	5½	5.25 26.8	19 30.1	10 47.3	+ 2 20.9	+0.7467	.5259	.1478	+90	+10
47 Arietis	6	5.38 25.6	20 11.4	18 28.4	+ 9 47.6	+1.0723	.5293	.1350	+90	+33
ε Arietis, mult.	4½	+5.40 +25.7	+20 51.7	19 1.6	+10 19.8	+0.3994	.5296	+1341	+67	- 7
66 Arietis	6½	5.64 23.2	22 23.5	<sup>24</sup> 9 4.5	- 0 4.1	+0.4109	.5357	.1089	+68	- 4
7 Tauri	6	5.74 22.9	24 3.8	11 53.6	+ 2 39.6	-1.1463	.5370	.1035	-32	-66
9 Tauri	6	5.71 22.3	22 48.9	13 7.0	+ 3 50.7	+0.3653	.5375	.1012	+64	- 5
g Pleiadum	5½	5.79 21.7	23 54.8	16 47.6	+ 7 24.1	-0.4952	.5391	.0940	+14	-53
b Pleiadum	4	+5.79 +21.6	+23 44.2	16 49.8	+ 7 26.2	-0.2964	.5391	+0940	+25	-41
m Pleiadum	7	5.82 21.7	24 27.8	16 56.9	+ 7 33.1	-1.0914	.5391	.0937	-27	-66
e Pleiadum	5	5.80 21.6	24 5.5	16 58.7	+ 7 34.8	-0.6764	.5391	.0936	+ 3	-64
c Pleiadum	5	5.81 21.5	23 59.6	17 16.3	+ 7 51.9	-0.5404	.5393	.0927	+11	-55
d Pleiadum	5	5.79 21.4	23 34.6	17 31.1	+ 8 6.2	-0.0530	.5394	.0926	+38	-26
η Tauri	3	+5.80 +21.3	+23 44.1	18 3.5	+ 8 37.5	-0.1805	.5396	+0915	+31	-33
29 Pleiadum	6½	5.82 21.2	23 58.6	18 31.8	+ 9 4.9	-0.4056	.5398	.0906	+19	-46
f Pleiadum	4	5.81 21.1	23 41.3	18 50.9	+ 9 23.3	-0.0558	.5399	.0899	+38	-26
h Pleiadum	5½	5.81 21.1	23 46.3	18 51.5	+ 9 23.9	-0.1478	.5399	.0899	+33	-31
33 Tauri	6	5.83 19.9	22 49.7	22 34.3	-11 0.5	+1.2190	.5414	.0824	+90	+53
36 Tauri	6	+5.90 +19.4	+23 46.6	<sup>25</sup> 1 57.2	- 7 44.3	+0.4322	.5427	+0755	+70	+ 1
χ' Tauri	5½	6.06 17.2	25 20.8	10 21.4	+ 0 23.1	-0.7492	.5456	.0578	- 2	-65
χ'' Tauri	8½	6.06 17.2	25 20.7	10 21.6	+ 0 23.3	-0.7511	.5456	.0578	- 2	-65
62 Tauri, mult.	6	6.01 16.8	24 1.4	11 2.5	+ 1 2.9	+0.7591	.5458	.0564	+90	+21
B. A. C. 1518	6	6.17 12.6	24 24.0	<sup>26</sup> 1 47.9	- 8 41.5	+0.9331	.5495	.0240	+90	+35
κ Tauri	5½	+6.19 +12.4	+24 51.9	2 38.7	- 7 52.4	+0.4362	.5497	+0221	+70	+ 6
118 Tauri	6	6.33 7.8	25 3.2	16 44.9	+ 5 45.1	+0.3130	.5516	-0.100	+61	+ 1
125 Tauri	6	6.39 6.4	25 49.8	21 27.4	+10 18.0	-0.6173	.5520	.0207	+ 6	-55
132 Tauri	5½	6.35 5.0	24 31.6	<sup>27</sup> 1 40.9	- 9 37.3	+0.7129	.5521	.0304	+90	+21
139 Tauri	5½	6.43 3.7	25 56.3	5 42.4	- 5 44.0	-0.9851	.5521	.0395	-19	-64
5 Geminorum	6	+6.36 +1.5	+24 26.7	11 52.5	+ 0 13.5	+0.3731	.5519	-0.0535	+65	0
B. A. C. 2154	6½	6.39 - 2.4	24 41.3	23 38.7	+11 35.6	-0.6767	.5503	.0795	+ 3	-63
B. A. C. 2238	6	6.34 4.6	23 44.5	<sup>28</sup> 6 19.2	- 5 57.4	-0.2163	.5489	.0938	+29	-35
44 Geminorum	6½	6.27 6.7	22 48.9	12 27.0	- 0 1.9	+0.1851	.5474	.1066	+53	-16
δ Gemi., mult.	3½	6.22 8.8	22 12.1	19 19.0	+ 6 36.2	+0.0768	.5455	.1204	+46	-22
58 Geminorum	6	+6.25 - 9.4	+23 10.4	20 50.9	+ 8 5.2	-1.1722	.5450	-1235	-34	-67
63 Gemi., mult.	5½	6.19 9.9	21 41.3	22 52.3	+10 2.5	+0.1961	.5443	.1274	+53	-17
85 Geminorum	5½	6.05 13.8	20 11.9	<sup>29</sup> 12 0.8	- 1 14.8	-0.0175	.5398	.1529	+40	-31
B. A. C. 2683	6	5.99 14.9	19 10.8	16 21.1	+ 2 57.0	+0.4159	.5385	.1593	+67	- 9
ζ Cancri	4½	5.92 15.8	18 0.4	19 55.5	+ 6 24.5	+1.1064	.5372	.1652	+90	+32
ζ Cancri	7½	+5.93 -15.6	+18 0.2	19 55.7	+ 6 24.7	+1.1107	.5372	-1652	+90	+32
δ' Cancri	6	5.91 17.3	18 42.9	<sup>30</sup> 1 16.1	+11 34.9	-0.5658	.5353	.1737	+11	-66
δ' Cancri	6	5.86 17.5	17 26.3	2 29.5	-11 14.1	+0.6015	.5348	.1757	+83	- 1
θ Cancri	6	5.87 18.2	18 29.8	5 14.8	- 8 34.1	-1.0323	.5339	.1798	-19	-72
54 Cancri	6½	5.71 20.4	15 47.6	14 45.3	+ 0 38.4	+0.1128	.5306	.1934	+48	-29
ο' Cancri	6	+5.67 -21.1	+15 46.8	17 47.9	+ 3 35.3	-0.4675	.5295	-1974	+16	-62
ο' Cancri	6	5.68 21.1	16 2.3	17 57.7	+ 3 44.8	-0.7780	.5295	.1976	- 1	-74
ξ Leonis	6	5.40 23.9	11 49.7	<sup>31</sup> 11 4.2	+ 3 40.4	+0.1860	.5247	.2174	+52	-26
ο Leonis	3½	5.33 24.4	10 26.1	15 42.3	+ 0 49.1	+0.6567	.5234	.2219	+87	- 4
B. A. C. 3398	6	+5.25 -25.3	+ 9 29.9	23 23.2	+ 8 16.0	-0.0766	.5214	-2287	+37	-43

## OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT WASHINGTON, D. C., DURING THE YEAR 1879.

Date.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of eclipse.
			Washington		Angle from		Washington		Angle from		
			Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	
			h m	h m	°		h m	h m	°	limb.	h m
Jan. 2	26 Arietis	6	5 43	10 54	197	251	Star 1' 2	south of	D's	limb.	
4	χ <sup>1</sup> Tauri	5½	9 35	14 37	264	320	10 34	15 36	193	146	0 59
4	χ <sup>2</sup> Tauri	8½	9 35	14 37	265	321	10 34	15 36	92	145	0 59
6	139 Tauri	5½	23 23	4 18	248	196	0 14	5 9	123	67	0 51
7	ω Geminor.	6	2 24	7 15	235	177	3 24	8 15	118	60	1 1
7	48 Geminor.	6	8 36	13 27	238	25	Star 1' 8	north of	D's	limb.	
7	Vesta		12 14	17 4	159	215	Star 2' 9	south of	D's	limb.	
7	58 Geminor.	6	13 50	18 40	232	333	14 33	19 23	41	88	0 43
10	B. A. C. 3345†	6	2 55	7 34	310	260	3 23	8 2	11	320	0 28
11	35 Sext., mult.	6½	5 1	9 36	267	216	5 56	10 31	38	348	0 56
13	B. A. C. 4201	6	7 8	11 34	197	147	7 51	12 18	102	55	0 44
31	g Pleiadum	5½	1 5	4 22	254	198	2 11	5 28	149	104	1 7
31	b Pleiadum	4	1 30	4 47	202	149	Star 4' 2	south of	D's	limb.	
31	m Pleiadum	7	2 24	5 41	22	340	Star 4' 5	north of	D's	limb.	
31	e Pleiadum	5	1 19	4 36	286	232	2 47	6 4	116	84	1 28
31	c Pleiadum	5	1 46	5 3	249	198	2 54	6 11	151	121	1 8
Feb. 2	139 Tauri†	5½	13 16	16 23	281	328	14 1	17 8	61	102	0 45
3	e Geminorum	3½	7 33	10 37	262	299	8 51	11 55	62	117	1 18
5	B. A. C. 2854	6½	4 2	6 59	344	289	Star 1' 6	north of	D's	limb.	
12	B. A. C. 4984	6	13 59	16 27	210	196	15 4	17 31	104	104	1 5
13	B. A. C. 5314*	6	10 12	12 36	272	220	11 6	13 30	51	3	0 54
13	B. A. C. 5347	5	12 20	14 44	250	210	13 31	15 55	71	41	1 11
15	B. A. C. 6194	5½	16 10	18 25	271	247	17 35	19 50	99	91	1 25
28	χ <sup>1</sup> Tauri	5½	5 50	7 17	239	289	7 1	8 28	126	184	1 11
28	χ <sup>2</sup> Tauri	8½	5 50	7 17	240	290	7 2	8 28	125	183	1 12
Mar. 3	58 Geminor.	6	13 1	14 14	286	341	13 44	14 58	35	86	0 43
12	b Scorpii	5	14 10	14 48	241	221	15 28	16 6	84	80	1 19
17	B. A. C. 7202	6	16 57	17 14	304	263	18 14	18 32	99	68	1 18
18	B. A. C. 7487†	6½	15 56	16 10	0	310	16 18	16 32	39	349	0 22
29	139 Tauri	5½	9 50	9 21	290	350	10 45	10 16	43	101	0 55
Apr. 5	B. A. C. 4201	6½	17 28	16 31	336	287	Star 5' 3	north of	D's	limb.	
9	a Scorpi., mult.	1½	15 27	14 15	348	337	Star 1' 1	north of	D's	limb.	
12	B. A. C. 6699	6½	15 21	13 57	296	253	16 33	15 8	83	49	1 12
12	53 Sagittarii	6	18 13	16 48	197	180	Star 0' 0	south of	D's	limb.	
25	125 Tauri	6	9 47	7 32	281	340	10 47	8 32	56	113	1 0
26	B. A. C. 2154	6½	11 35	9 16	287	344	12 24	10 5	40	94	0 49
28	δ <sup>1</sup> Cancri	6	11 30	9 3	223	277	12 32	10 6	81	136	1 3
May 6	B. A. C. 5197†	6	10 15	7 17	279	228	11 5	8 7	42	355	0 50
6	A <sup>3</sup> Scorpii	5	13 42	10 44	282	257	14 47	11 48	43	30	1 4
6	B. A. C. 5255	6	13 59	11 1	273	251	15 11	12 12	52	44	1 11
6	3 Scorpii	6	14 42	11 43	343	329	Star 0' 4	north of	D's	limb.	
6	B. A. C. 5314	6	18 49	15 50	267	300	19 55	16 56	88	130	1 6
9	B. A. C. 6576	6	17 39	14 28	301	282	19 0	15 48	91	89	1 21
17	101 Piscium†	6	18 36	14 54	314	265	19 30	15 47	97	45	0 53
24	δ Geminor.*	3½	14 34	10 25	189	236	14 55	10 46	138	183	0 21
26	α <sup>1</sup> Cancri	6	10 48	6 31	241	283	11 59	7 43	55	106	1 12
26	α <sup>2</sup> Cancri	6	11 14	6 57	328	15	Star 0' 9	north of	D's	limb.	
27	B. A. C. 3398†	6	16 7	11 46	261	312	16 56	12 35	49	98	0 49
28	34 Sextantis	6	14 28	10 3	260	307	15 26	11 1	40	90	0 58
31	69 Virginis	5½	19 26	14 49	163	215	Star 3' 0	south of	D's	limb.	

OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT WASHINGTON, D. C., DURING THE YEAR 1879.													
Date.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Oc- cultation.		
			Washington		Angle from		Washington		Angle from				
			Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.			
			h m	h m			h m	h m	°	°	h m		
June 3	α Scorp., mult.	1½	15 45	10 56	294	286	16 52	12 3	49	55	1 6		
7	β Capricorni	5½	16 34	11 29	324	281	17 35	12 30	75	40	1 1		
9	ρ Aquarii	5½	17 1	11 48	318	268	18 3	12 50	94	48	1 2		
15	ε Arietis	4½	21 15	15 38	285	231	22 17	16 40	124	68	1 2		
16	d Pleiadum	5	20 24	14 43	16	328	Star 3'1.	north of	♂'s	limb.			
16	f Pleiadum	4	21 22	15 41	348	296	21 51	16 10	48	354	0 28		
16	h Pleiadum	5½	21 40	15 59	18	324	Star 2'7.	north of	♂'s	limb.			
21	85 Geminor.	5½	14 6	8 7	232	284	14 56	8 57	87	135	0 50		
22	54 Cancri*	6½	15 54	9 50	230	278	16 40	10 36	87	131	0 46		
30	B. A. C. 5255	6	13 9	6 34	301	271	14 18	7 44	21	357	1 10		
30	3 Scorprii	6	13 46	7 11	335	311	13 54	7 19	348	325	0 8		
30	π Scorprii	3	16 31	9 56	168	177	Star 2'7.	south of	♂'s	limb.			
30	B. A. C. 5314	6	18 9	11 34	277	303	19 20	12 44	76	114	1 10		
30	B. A. C. 5347*	5	20 54	14 19	180	228	Star 7'0.	south of	♂'s	limb.			
July 1	B. A. C. 5800†	6½	20 49	14 9	267	307	21 49	15 10	109	156	1 1		
3	B. A. C. 6576	6	17 4	10 17	264	238	18 19	11 32	124	114	1 15		
8	15 Piscium	6½	19 36	12 28	280	233	20 44	13 37	149	109	1 8		
13	66 Arietis	6½	20 33	13 6	252	202	21 18	13 50	146	93	0 45		
29	B. A. C. 6024	6½	20 7	11 37	191	219	Star 0'9.	south of	♂'s	limb.			
Aug. 1	ν Capricorni†	5½	14 54	6 13	296	245	15 56	7 15	94	47	1 2		
1	B. A. C. 7263†	6	1 42	16 59	301	349	2 38	17 55	113	165	0 56		
2	λ Capricor.	5½	0 20	15 34	264	298	1 12	16 26	163	204	0 52		
13	B. A. C. 2238	6	2 26	16 56	178	120	Star 1'9.	south of	♂'s	limb.			
21	69 Virginis*	5½	19 27	9 27	163	215	Star 0'9.	south of	♂'s	limb.			
24	α Scorp. Mult.†	1½	20 47	10 35	254	299	21 44	11 32	111	162	0 57		
28	B. A. C. 7053	6	22 0	11 32	348	9	22 50	12 22	72	102	0 50		
28	σ Capricorni	6	22 0	11 32	348	9	22 50	12 22	72	102	0 50		
29	29 Capricorni	5½	17 21	6 49	202	160	Star 0'1.	south of	♂'s	limb.			
30	θ Aquarii	4½	1 33	14 56	280	321	2 33	15 57	144	191	1 1		
Sept. 6	9 Tauri†	6	20 9	9 6	309	262	20 59	9 56	87	36	0 50		
6	d Pleiadum	5	0 58	13 54	305	248	2 21	15 17	97	54	1 23		
6	γ Tauri	3	1 52	14 48	318	268	3 12	16 8	81	62	1 20		
6	29 Pleiadum	6½	3 25	16 21	18	7	Star 1'5.	north of	♂'s	limb.			
6	f Pleiadum	4	2 50	15 45	275	243	4 23	17 18	116	142	1 33		
6	h Pleiadum	5½	2 55	15 50	293	263	4 28	17 24	108	137	1 34		
20	B. A. C. 5314	6	17 56	5 58	209	233	18 38	6 40	141	173	0 42		
21	A¹ Ophiuchi*	6½	21 49	9 47	276	323	22 47	10 44	100	152	0 58		
21	A² Ophiuchi*	6	21 50	9 48	276	323	22 48	10 45	100	152	0 58		
24	σ Capricorni*	5½	1 26	13 12	304	354	2 20	14 5	105	157	0 54		
26	B. A. C. 7620	6	21 45	9 23	33	33	21 53	9 31	42	43	0 8		
28	16 Piscium	6	4 29	15 58	306	356	5 28	16 57	106	157	1 0		
Oct. 3	66 Arietis	6½	1 44	12 53	256	211	2 59	14 8	146	128	1 15		
8	85 Geminor.	6½	5 0	15 49	166	113	Star 0'5.	south of	♂'s	limb.			
25	B. A. C. 8152*	6½	5 34	15 17	204	255	Star 2'5.	south of	♂'s	limb.			
31	36 Tauri	6½	3 19	12 38	247	221	4 36	13 55	138	164	1 17		
Nov. 1	h Tauri	5½	4 39	13 54	199	189	5 4	14 19	169	180	0 25		
4	63 Gem. mult†	5½	23 59	9 3	275	228	0 54	9 58	75	23	0 55		
16	λ Sagittarii	3	20 51	5 8	206	236	21 2	5 20	187	219	0 12		
19	π Capricorni	5	20 39	4 49	350	354	21 29	5 39	67	89	0 50		
19	18 Aquarii	6	23 14	7 19	332	358	0 18	8 23	95	132	1 4		

OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT  
WASHINGTON, D. C., DURING THE YEAR 1879.

Date.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Oc- cultation.
			Washington		Angle from		Washington		Angle from		
			Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	
Nov. 22	19 Piscium	6	<sup>h</sup> m 0 28	<sup>h</sup> m 8 21	333 <sup>s</sup>	348 <sup>o</sup>	<sup>h</sup> m 1 43	<sup>h</sup> m 9 36	101 <sup>o</sup>	114 <sup>o</sup>	<sup>h</sup> m 1 15
26	ε Arietis, <i>mult.</i>	4½	5 19	12 56	269	321	6 37	14 14	114	170	1 19
29	118 Tauri	6	1 9	8 35	290	231	2 25	9 51	96	28	1 16
Dec. 1	δ Geminor.	3½	4 34	11 51	283	229	5 53	13 11	50	10	1 19
1	63 Gem., <i>mult.</i>	5½	10 21	17 41	336	32	10 27	17 44	338	34	0 3
2	B. A. C. 2683	6	1 23	8 37	239	188	2 19	9 33	102	48	0 56
4	B. A. C. 3407	6	11 50	18 54	293	330	12 30	19 34	358	41	0 40
5	36 Sextantis	6	11 35	18 35	191	209	12 33	19 34	95	127	0 58
19	α Piscium	4½	22 32	4 40	358	343	23 26	5 33	78	80	0 54
19	9 Piscium	6	22 14	4 22	318	299	23 37	5 45	119	124	1 23
24	66 Arietis	6½	2 26	8 13	263	231	3 50	9 38	134	153	1 25
24	9 Tauri	6	8 14	14 0	275	332	9 18	15 5	91	145	1 5
26	118 Tauri	6	12 23	18 1	351	40	Star 4'.5	north of	♃'s	limb.	
27	5 Geminor.	6	5 47	11 22	235	222	7 11	12 46	104	143	1 23
28	44 Geminor.	6½	6 7	11 38	271	240	♄ 34	13 5	107	130	1 26
29	B. A. C. 2683	6	11 43	17 10	306	1	12 14	17 40	2	57	0 31
30	54 Cancri	6½	9 17	14 40	148	164	Star 1'.8	north of	♃'s	limb.	
31	ξ Leonis	6	3 44	9 3	264	212	4 47	10 6	55	2	1 2
31	ο Leonis	3½	10 21	15 39	224	241	11 38	16 57	66	105	1 18

NOTES.—B. A. C., British Association Catalogue.

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

The *Angles of Position*, for the points of contact, are for *direct vision*, and are reckoned from the *North Point* of the Moon's limb towards the West, and from its *Vertex* in the same direction, i. e. towards the right. For *inverted image*, add 180° to the angles given.

# 452 JUPITER'S SATELLITES, 1879.

WASHINGTON MEAN TIME.																			
January.																			
d	h	m	s				d	h	m	s									
1	6	59		II.	Oc.	Dis.	4	3	21		I.	Tr.	Eg.	6	16	20			
	9	17		I.	Oc.	Dis.			3	58		I.	Sh.	Eg.		16	48		
	11	12	54.3	II.	Ec.	Re.			17	43		IV.	Tr.	In.		18	8		
	12	13	28.2	I.	Ec.	Re.			20	25		II.	Oc.	Dis.		18	8		
2	6	30		I.	Tr.	In.			22	18		I.	Oc.	Dis.		19	17		
	7	9		I.	Sh.	In.			22	34		IV.	Tr.	Eg.		19	39	30.1	
	8	50		I.	Tr.	Eg.			23	7		IV.	Sh.	In.		7	14	2	
	9	29		I.	Sh.	Eg.		5	0	31	25.0	II.	Ec.	Re.		14	36		
	21	50		III.	Oc.	Dis.			1	10	48.7	I.	Ec.	Re.		16	22		
3	1	47		II.	Tr.	In.			4	2		IV.	Sh.	Eg.		16	56		
	3	3		II.	Sh.	In.			19	31		I.	Tr.	In.		8	9	51	
	3	48		I.	Oc.	Dis.			20	7		I.	Sh.	In.		11	19		
	3	57	31.5	III.	Ec.	Re.			21	51		I.	Tr.	Eg.		13	51	2.0	
	4	44		II.	Tr.	Eg.			22	27		I.	Sh.	Eg.		14	8	10.9	
	6	0		II.	Sh.	Eg.*		6	12	10		III.	Tr.	In.		9	8	33	
	6	42	8.7	I.	Ec.	Re.			14	25		III.	Sh.	In.		9	4		
4	1	1		I.	Tr.	In.			15	12		II.	Tr.	In.		10	53		
	1	38		I.	Sh.	In.			15	51		III.	Tr.	Eg.		11	54		
The Satellites are not visible from January 9 to March 7, Jupiter being too near the Sun.																			
March.																			
7	0	24		I.	Sh.	In.	13	5	2	4.0	I.	Ec.	Dis.	19	10	25			
	0	53		I.	Tr.	In.			5	19		IV.	Tr.	In.		12	5		
	2	45		I.	Sh.	Eg.			7	55		I.	Oc.	Re.		12	45		
	3	13		I.	Tr.	Eg.			10	13		IV.	Tr.	Eg.		13	0		
	21	36	28.9	I.	Ec.	Dis.			10	36	51.2	II.	Ec.	Dis.		20	6	56	6.3
8	0	24		I.	Oc.	Re.			14	42		II.	Oc.	Re.		9	55		
	2	17		II.	Sh.	In.		14	2	18		I.	Sh.	In.		13	13	43.1	
	3	18		II.	Tr.	In.			2	54		I.	Tr.	In.		17	32		
	5	13		II.	Sh.	Eg.			4	39		I.	Sh.	Eg.		21	4	12	
	6	14		II.	Tr.	Eg.			5	14		I.	Tr.	Eg.		4	56		
	12	28	52.8	III.	Ec.	Dis.			23	30	33.6	I.	Ec.	Dis.		6	33		
	18	9		III.	Oc.	Re.		15	2	25		I.	Oc.	Re.		7	15		
	18	52		I.	Sh.	In.			4	51		II.	Sh.	In.		7	40	52.3	
	19	23		I.	Tr.	In.			6	6		II.	Tr.	In.		12	22	50.7	
	21	13		I.	Sh.	Eg.			7	47		II.	Sh.	Eg.		14	17		
	21	43		I.	Tr.	Eg.			9	2		II.	Tr.	Eg.		19	11		
9	16	5	0.5	I.	Ec.	Dis.			16	29	35.8	III.	Ec.	Dis.		22	1	24	34.8
	18	54		I.	Oc.	Re.			20	46		I.	Sh.	In.		4	26		
	21	17	53.8	II.	Ec.	Dis.			21	24		I.	Tr.	In.		7	26		
10	1	16		II.	Oc.	Re.			22	38		III.	Oc.	Re.		8	55		
	13	20		I.	Sh.	In.			23	7		I.	Sh.	Eg.		10	22		
	13	53		I.	Tr.	In.			23	44		I.	Tr.	Eg.		11	50		
	15	41		I.	Sh.	Eg.		16	17	59	5.4	I.	Ec.	Dis.		20	29	37.8	
	16	13		I.	Tr.	Eg.			20	55		I.	Oc.	Re.		22	41		
11	10	33	30.8	I.	Ec.	Dis.			23	54	53.1	II.	Ec.	Dis.		23	26		
	13	24		I.	Oc.	Re.		17	4	7		II.	Oc.	Re.		23	1	2	
	15	34		II.	Sh.	In.			15	15		I.	Sh.	In.		1	45		
	16	42		II.	Tr.	In.			15	55		I.	Tr.	In.		3	6		
	18	30		II.	Sh.	Eg.			17	36		I.	Sh.	Eg.*		19	53	5.1	
	19	38		II.	Tr.	Eg.			18	15		I.	Tr.	Eg.		22	56		
12	2	33		III.	Sh.	In.		18	12	27	33.6	I.	Ec.	Dis.		24	2	31	41.3
	4	50		III.	Tr.	In.			15	25		I.	Oc.	Re.		6	57		
	6	16		III.	Sh.	Eg.			18	9		II.	Sh.	In.		17	10		
	7	49		I.	Sh.	In.			19	30		II.	Tr.	In.		17	56		
	8	23		I.	Tr.	In.			21	5		II.	Sh.	Eg.		19	30		
	8	32		III.	Tr.	Eg.			22	26		II.	Tr.	Eg.		20	15		
	10	10		I.	Sh.	Eg.		19	6	33		III.	Sh.	In.		25	14	21	33.4
	10	44		I.	Tr.	Eg.			9	18		III.	Tr.	In.		17	26		
	23	54		IV.	Sh.	In.			9	44		I.	Sh.	In.		20	44		
13	4	49		IV.	Sh.	Eg.			10	16		III.	Sh.	Eg.		22	19		

NOTE.—For Phases of Eclipses see pages 464 and 465.

\* Visible at Washington.

Ec., denotes eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow;

# JUPITER'S SATELLITES, 1879. 453

## WASHINGTON MEAN TIME.

### March.

d	h	m	s		d	h	m	s		d	h	m	s	
25	23	40		II. Sh. Eg.	28	6	7		I. Sh. In.	30	1	27		I. Tr. In.
26	1	14		II. Tr. Eg.		6	57		I. Tr. In.		1	57		IV. Tr. In.
	10	34		III. Sh. In.		8	27		I. Sh. Eg.		2	56		I. Sh. Eg.
	11	38		I. Sh. In.		9	16		I. Tr. Eg.		3	46		I. Tr. Eg.
	12	26		I. Tr. In.	29	3	18	33.4	I. Ec. Dis.		6	49		IV. Tr. Eg.
	13	46		III. Tr. In.		6	26		I. Oc. Re.		7	31		III. Oc. Re.
	13	59		I. Sh. Eg.		10	1		II. Sh. In.		21	47	3.2	I. Ec. Dis.
	14	16		III. Sh. Eg.		11	43		II. Tr. In.	31	0	56		I. Oc. Re.
	14	46		I. Tr. Eg.		12	57		II. Sh. Eg.		5	8	18.3	II. Ec. Dis.
	17	28		III. Tr. Eg.		14	38		II. Tr. Eg.		9	46		II. Oc. Re.
27	8	50	5.6	I. Ec. Dis.		18	5		IV. Sh. In.		19	4		I. Sh. In.
	11	56		I. Oc. Re.		23	0		IV. Sh. Eg.		19	57		I. Tr. In.
	15	50	23.7	II. Ec. Dis.	30	0	29	29.9	III. Ec. Dis.		21	25		I. Sh. Eg.
	20	22		II. Oc. Re.		0	36		I. Sh. In.		22	16		I. Tr. Eg.

### April.

1	16	15	30.5	I. Ec. Dis.	7	23	19		I. Sh. Eg.	15	12	17		IV. Sh. In.
	19	26		I. Oc. Re.	8	0	16		I. Tr. Eg.		17	9		IV. Sh. Eg.
	23	19		II. Sh. In.		18	9	25.5	I. Ec. Dis.		20	3	18.8	I. Ec. Dis.
2	1	7		II. Tr. In.		21	26		I. Oc. Re.		22	16		IV. Tr. In.
	2	15		II. Sh. Eg.	9	1	54		II. Sh. In.		23	25		I. Oc. Re.
	4	2		II. Tr. Eg.		3	53		II. Tr. In.	16	3	3		IV. Tr. Eg.
	13	33		I. Sh. In.		4	50		II. Sh. Eg.		4	29		II. Sh. In.
	14	27		I. Tr. In.		6	48		II. Tr. Eg.		6	39		II. Tr. In.
	14	35		III. Sh. In.		15	27		I. Sh. In.		7	25		II. Sh. Eg.
	15	53		I. Sh. Eg.		16	27		I. * Tr. In.		9	34		II. Tr. Eg.
	16	46		I. * Tr. Eg.		17	47		I. Sh. Eg.		17	21		I. Sh. In.
	18	12		III. Tr. In.		18	35		III. Sh. In.		18	27		I. Tr. In.
	18	17		III. Sh. Eg.		18	46		I. Tr. Eg.		19	41		I. Sh. Eg.
	21	53		III. Tr. Eg.		22	17		III. Sh. Eg.		20	45		I. Tr. Eg.
3	10	44	2.4	I. Ec. Dis.		22	37		III. Tr. In.		22	35		III. Sh. In.
	13	56		I. Oc. Re.	10	2	17		III. Tr. Eg.	17	2	17		III. Sh. Eg.
	18	26	52.6	II. Ec. Dis.		12	37	56.9	I. Ec. Dis.		2	59		III. Tr. In.
	23	11		II. Oc. Re.		15	55		I. Oc. Re.		6	39		III. Tr. Eg.
						21	3	11.8	II. Ec. Dis.		14	31	49.9	I. Ec. Dis.
4	8	1		I. Sh. In.	11	1	58		II. Oc. Re.		17	55		I. Oc. Re.
	8	57		I. Tr. In.		9	55		I. Sh. In.		23	39	15.7	II. Ec. Dis.
	10	22		I. Sh. Eg.		10	57		I. Tr. In.	18	4	44		II. Oc. Re.
	11	16		I. Tr. Eg.		12	16		I. Sh. Eg.		11	50		I. Sh. In.
5	5	12	29.6	I. Ec. Dis.		13	16		I. Tr. Eg.		12	56		I. Tr. In.
	8	26		I. Oc. Re.							14	10		I. Sh. Eg.
	12	36		II. Sh. In.	12	7	6	23.7	I. Ec. Dis.		15	15		I. Tr. Eg.
	14	30		II. Tr. In.		10	25		I. Oc. Re.	19	9	0	16.1	I. Ec. Dis.
	15	32		II. Sh. Eg.		15	11		II. Sh. In.		12	24		I. Oc. Re.
	17	25		II. Tr. Eg.		17	16		II. Tr. In.		17	47		II. Sh. In.
6	2	30		I. Sh. In.		18	7		II. Sh. Eg.		20	2		II. Tr. In.
	3	27		I. Tr. In.		20	11		II. Tr. Eg.		20	42		II. Sh. Eg.
	4	29	15.0	III. Ec. Dis.	13	4	24		I. Sh. In.		22	56		II. Tr. Eg.
	4	50		I. Sh. Eg.		5	27		I. Tr. In.					
	5	46		I. Tr. Eg.		6	44		I. Sh. Eg.	20	6	18		I. Sh. In.
	8	1	41.2	III. Ec. Re.		7	46		I. Tr. Eg.		7	26		I. Tr. In.
	8	14		III. Oc. Dis.		8	29	6.4	III. Ec. Dis.		8	38		I. Sh. Eg.
	11	55		III. Oc. Re.		12	1	21.6	III. Ec. Re.		9	45		I. Tr. Eg.
	23	40	58.9	I. Ec. Dis.		12	37		III. Oc. Dis.		12	29	32.2	III. Ec. Dis.
7	1	51	9.4	IV. Ec. Dis.		16	17		III. * Oc. Re.		16	1	35.0	III. * Ec. Re.
	2	56		I. Oc. Re.	14	1	34	52.8	I. Ec. Dis.		16	58		III. Oc. Dis.
	6	31	46.2	IV. Ec. Re.		4	55		I. Oc. Re.		20	38		III. Oc. Re.
	7	44	43.4	II. Ec. Dis.		10	20	57.0	II. Ec. Dis.	21	3	28	45.2	I. Ec. Dis.
	10	46		IV. Oc. Dis.		15	21		II. Oc. Re.		6	54		I. Oc. Re.
	12	34		II. Oc. Re.		23	52		I. Sh. In.		12	56	58.9	II. Ec. Dis.
	15	35		IV. Oc. Re.		23	57		I. Tr. In.		18	6		II. Oc. Re.
	20	58		I. Sh. In.	15	1	13		I. Sh. Eg.	22	0	46		I. Sh. In.
	21	57		I. Tr. In.		2	16		I. Tr. Eg.		1	56		I. Tr. In.

In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance. \* Visible at Washington.



# 454 JUPITER'S SATELLITES, 1879.

## WASHINGTON MEAN TIME.

### April.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
22	3	7		I. Sh. Eg.	24	16	25	41.9	I. * Ec. Dis.	27	21	17		III. Oc. Dis.	30	0	55		III. Oc. Re.
	4	15		I. Tr. Eg.		19	53		I. Oc. Re.	28	5	22	37.1	I. Ec. Dis.		5	22		I. Ec. Re.
	21	57	10.8	I. Ec. Dis.	25	2	15	9.4	II. Ec. Dis.		8	52		I. Ec. Re.		15	32	49.2	II. * Ec. Dis.
23	1	24		II. Oc. Re.		7	29		II. Oc. Re.		20	50		II. Oc. Re.	29	2	40		I. Sh. In.
	7	5		II. Sh. In.		13	43		I. Sh. In.		3	54		I. Tr. In.		5	0		I. Sh. Eg.
	9	24		II. Tr. In.		14	55		I. Tr. In.		6	13		I. Tr. Eg.		23	51	2.4	I. Ec. Dis.
	10	0		II. Sh. Eg.		16	4		I. * Sh. Eg.		9	40		I. Oc. Re.		9	40		II. Sh. In.
	12	18		II. Tr. Eg.		17	14		I. Tr. Eg.		12	8		II. Sh. In.		12	8		II. Tr. In.
	19	15		I. Sh. In.	26	10	54	8.0	I. Ec. Dis.		12	35		II. Sh. Eg.		15	2		II. Tr. Eg.
	20	0	52.4	IV. Ec. Dis.		14	23		I. Oc. Re.		21	9		I. Sh. In.		22	23		I. Tr. In.
	20	26		I. Tr. In.		20	22		II. Sh. In.		23	29		I. Sh. Eg.					I. Sh. Eg.
	21	35		I. Sh. Eg.		22	46		II. Tr. In.										
	22	44		I. Tr. Eg.		23	17		II. Sh. Eg.										
24	0	39	44.6	IV. Ec. Re.	27	1	40		II. Tr. Eg.										
	2	35		III. Sh. In.		8	12		I. Sh. In.										
	6	17		III. Sh. Eg.		9	25		I. Tr. In.										
	6	52		IV. Oc. Dis.		10	32		I. Sh. Eg.										
	7	18		III. Tr. In.		11	43		I. Tr. Eg.										
	10	57		III. Tr. Eg.		16	29	39.7	III. * Ec. Dis.										
	11	36		IV. Oc. Re.		20	1	28.9	III. Ec. Re.										

### May.

1	0 42		I.	Tr.	Eg.	7	5 19		I.	Oc.	Re.	12	12 46		I.	Oc.	Re.
	6 35		III.	Sh.	In.		12 16		II.	Sh.	In.		20 43	57.0	II.	Ec.	Dis.
	10 17		III.	Sh.	Eg.		14 51		II. *	Tr.	In.	13	2 14		II.	Oc.	Re.
	11 35		III.	Tr.	In.		15 11		II. *	Sh.	Eg.		6 28		I.	Sh.	In.
	15 13		III. *	Tr.	Eg.		17 44		II.	Tr.	Eg.		7 48		I.	Tr.	In.
	18 19	33.5	I.	Ec.	Dis.		23 3		I.	Sh.	In.		8 48		I.	Sh.	Eg.
	21 51		I.	Oc.	Re.	8	0 20		I.	Tr.	In.		10 7		I.	Tr.	Eg.
2	4 50	51.9	II.	Ec.	Dis.		1 23		I.	Sh.	Eg.	14	3 38	45.4	I.	Ec.	Dis.
	6 29		IV.	Sh.	In.		2 40		I.	Tr.	Eg.		7 15		I.	Oc.	Re.
	10 12		II.	Oc.	Re.		10 35		III.	Sh.	In.		14 51		II. *	Sh.	In.
	11 19		IV.	Sh.	Eg.		14 17		III.	Sh.	Eg.		17 31		II.	Tr.	In.
	15 37		I. *	Sh.	In.		15 49		III. *	Tr.	In.		17 46		II.	Sh.	Eg.
	16 53		I.	Tr.	In.		19 27		III.	Tr.	Eg.		20 24		II.	Tr.	Eg.
	17 57		I.	Sh.	Eg.		20 13	25.0	I.	Ec.	Dis.	15	0 57		I.	Sh.	In.
	18 8		IV.	Tr.	In.		23 48		I.	Oc.	Re.		2 17		I.	Tr.	In.
	19 12		I.	Tr.	Eg.	9	7 26	23.7	II.	Ec.	Dis.		3 17		I.	Sh.	Eg.
	22 48		IV.	Tr.	Eg.		12 54		II.	Oc.	Re.		4 36		I.	Tr.	Eg.
3	12 47	59.3	I.	Ec.	Dis.		17 31		I.	Sh.	In.		14 35		III. *	Sh.	In.
	16 20		I. *	Oc.	Re.		18 50		I.	Tr.	In.		18 17		III.	Sh.	Eg.
	22 58		II.	Sh.	In.		19 51		I.	Sh.	Eg.		20 1		III.	Tr.	In.
4	1 30		II.	Tr.	In.		21 9		I.	Tr.	Eg.		22 7	17.0	I.	Ec.	Dis.
	1 53		II.	Sh.	Eg.	10	14 10	40.2	IV.	Ec.	Dis.		23 37		III.	Tr.	Eg.
	4 23		II.	Tr.	Eg.		14 41	50.9	I. *	Ec.	Dis.	16	1 45		I.	Oc.	Re.
	10 6		I.	Sh.	In.		18 17		I.	Oc.	Re.		10 1	45.2	II.	Ec.	Dis.
	11 22		I.	Tr.	In.		18 47	24.6	IV.	Ec.	Re.		15 34		II. *	Oc.	Re.
	12 26		I.	Sh.	Eg.	11	1 33		II.	Sh.	In.		19 25		I.	Sh.	In.
	13 41		I.	Tr.	Eg.		2 26		IV.	Oc.	Dis.		20 46		I.	Tr.	In.
	20 30	12.5	III.	Ec.	Dis.		4 11		II.	Tr.	In.		21 45		I.	Sh.	Eg.
5	0 1	46.7	III.	Ec.	Re.		4 28		II.	Sh.	Eg.		23 5		I.	Tr.	Eg.
	1 33		III.	Oc.	Dis.		7 1		IV.	Oc.	Re.	17	16 35	43.1	I.	Ec.	Dis.
	5 11		III.	Oc.	Re.		7 4		II.	Tr.	Eg.		20 13		I.	Oc.	Re.
	7 16	28.6	I.	Ec.	Dis.		12 0		I.	Sh.	In.	18	4 9		II.	Sh.	In.
	10 50		I.	Oc.	Re.		13 19		I.	Tr.	In.		6 51		II.	Tr.	In.
	18 8	28.4	II.	Ec.	Dis.		14 20		I.	Sh.	Eg.		7 4		II.	Sh.	Eg.
	23 33		II.	Oc.	Re.		15 38		I. *	Tr.	Eg.		9 44		II.	Tr.	Eg.
6	0 34		I.	Sh.	In.	12	0 30	7.9	III.	Ec.	Dis.		13 54		I.	Sh.	In.
	5 51		I.	Tr.	In.		4 1	25.9	III.	Ec.	Re.		15 15		I. *	Tr.	In.
	6 54		I.	Sh.	Eg.		5 46		III.	Oc.	Dis.		16 14		I. *	Sh.	Eg.
	8 10		I.	Tr.	Eg.		9 10	20.3	I.	Ec.	Dis.		17 34		I.	Tr.	Eg.
7	1 44	53.7	I.	Ec.	Dis.		9 22		III.	Oc.	Re.	19	0 40		IV.	Sh.	In.

NOTE.—For Phases of Eclipses see pages 464 and 465.

\* Visible at Washington.

Ec., denotes eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow;

# JUPITER'S SATELLITES, 1879. 455

## WASHINGTON MEAN TIME.

### May.

d	h	m	s		d	h	m	s		d	h	m	s	
19	4	29	56.6	III. Ec. Dis.	28	3	40		I. Oc. Re.	27	12	36		I. Sh. Eg.
	5	29		IV. Sh. Eg.		3	44		III. Tr. Eg.		12	55	41.3	IV. Ec. Re.
	8	0	57.4	III. Ec. Re.		12	36	56.9	II. Ec. Dis.		13	58		I. * Tr. Eg.
	9	55		III. Oc. Dis.		18	11		II. Oc. Re.		21	19		IV. Oc. Dis.
	11	4	13.1	I. Ec. Dis.		21	19		I. Sh. In.	28	1	45		IV. Oc. Re.
	13	23		IV. Tr. In.		22	42		I. Tr. In.		7	26	32.2	I. Ec. Dis.
	13	31		III. Oc. Re.		23	40		I. Sh. Eg.		11	6		I. Oc. Re.
	14	43		I. * Oc. Re.	24	1	1		I. Tr. Eg.		20	3		II. Sh. In.
	17	54		IV. Tr. Eg.		18	29	36.3	I. Ec. Dis.		22	49		II. Tr. In.
	23	19	15.3	II. Ec. Dis.		22	10		I. Oc. Re.		22	58		II. Sh. Eg.
20	4	53		II. Oc. Re.	25	6	45		II. Sh. In.	29	1	41		II. Tr. Eg.
	8	22		I. Sh. In.		9	30		II. Tr. In.		4	44		I. Sh. In.
	9	44		I. Tr. In.		9	40		II. Sh. Eg.		6	7		I. Tr. In.
	10	42		I. Sh. Eg.		12	23		II. Tr. Eg.		7	5		I. Sh. Eg.
	12	3		I. Tr. Eg.		15	48		I. * Sh. In.		8	27		I. Tr. Eg.
21	5	32	38.3	I. Ec. Dis.		17	10		I. Tr. In.		23	36		III. Sh. In.
	9	11		I. Oc. Re.		18	8		I. Sh. Eg.	30	1	55	4.4	I. Ec. Dis.
	17	27		II. Sh. In.		19	30		I. Tr. Eg.		2	17		III. Sh. Eg.
	20	11		II. Tr. In.	26	8	29	43.4	III. Ec. Dis.		4	13		III. Tr. In.
	20	22		II. Sh. Eg.		12	0	25.8	III. Ec. Re.		5	35		I. Oc. Re.
	23	4		II. Tr. Eg.		12	58	6.8	I. Ec. Dis.		7	47		III. Tr. Eg.
22	2	51		I. Sh. In.		14	1		III. * Oc. Dis.		15	11	59.8	II. * Ec. Dis.
	4	13		I. Tr. In.		16	38		I. Oc. Re.		20	48		II. Oc. Re.
	5	11		I. Sh. Eg.		17	35		III. Oc. Re.		23	13		I. Sh. In.
	6	32		I. Tr. Eg.	27	1	54	24.1	II. Ec. Dis.	31	0	36		I. Tr. In.
	18	36		III. Sh. In.		7	30		II. Oc. Re.		1	33		I. Sh. Eg.
	22	16		III. Sh. Eg.		8	21	19.3	IV. Ec. Dis.		2	55		I. Tr. Eg.
23	0	1	10.0	I. Ec. Dis.		10	16		I. Sh. In.		20	23	31.0	I. Ec. Dis.
	0	9		III. Tr. In.		11	39		I. Tr. In.					

### June.

1	0	4		I. Oc. Re.	5	8	1		I. Tr. In.	10	1	34		III. Oc. Re.
	9	21		II. Sh. In.		8	58		I. Sh. Eg.		7	4	17.0	II. Ec. Dis.
	12	7		II. Tr. In.		10	20		I. Tr. Eg.		12	38		II. Oc. Re.
	12	16		II. Sh. Eg.		12	15		IV. Tr. Eg.		14	4		I. * Sh. In.
	14	59		II. * Tr. Eg.	6	2	36		III. Sh. In.		15	26		I. * Tr. In.
	17	41		I. Sh. In.		3	49	0.3	I. Ec. Dis.		16	24		I. Sh. Eg.
	19	4		I. Tr. In.		6	16		III. Sh. Eg.		17	45		I. Tr. Eg.
	20	1		I. Sh. Eg.		7	29		I. Oc. Re.	11	11	14	25.2	I. Ec. Dis.
	21	24		I. Tr. Eg.		8	13		III. Tr. In.		14	53		I. * Oc. Re.
2	12	29	40.0	III. Ec. Dis.		11	46		III. Tr. Eg.	12	1	15		II. Sh. In.
	14	52	2.0	I. * Ec. Dis.		17	46	54.6	II. Ec. Dis.		3	59		II. Tr. In.
	16	0	2.2	III. Ec. Re.		23	22		II. Oc. Re.		4	10		II. Sh. Eg.
	18	3		III. Oc. Dis.	7	1	7		I. Sh. In.		6	50		II. Tr. Eg.
	18	32		I. Oc. Re.		2	30		I. Tr. In.		8	32		I. Sh. In.
	21	36		III. Oc. Re.		3	27		I. Sh. Eg.		9	54		I. Tr. In.
3	4	29	24.4	II. Ec. Dis.		4	49		I. Tr. Eg.		10	52		I. Sh. Eg.
	10	5		II. Oc. Re.		22	17	27.5	I. Ec. Dis.		12	13		I. Tr. Eg.
	12	10		I. Sh. In.	8	1	57		I. Oc. Re.	13	2	31	52.7	IV. Ec. Dis.
	13	33		I. * Tr. In.		11	57		II. Sh. In.		5	42	58.8	I. Ec. Dis.
	14	30		I. * Sh. Eg.		14	42		II. * Tr. In.		6	36		III. Sh. In.
	15	52		I. * Tr. Eg.		14	52		II. * Sh. Eg.		7	3	12.3	IV. Ec. Re.
4	9	20	27.6	I. Ec. Dis.		17	34		II. Tr. Eg.		9	22		I. Oc. Re.
	13	0		I. Oc. Re.		19	35		I. Sh. In.		10	16		III. Sh. Eg.
	18	52		IV. Sh. In.		20	58		I. Tr. In.		12	10		III. Tr. In.
	22	39		II. Sh. In.		21	55		I. Sh. Eg.		15	24		IV. * Oc. Dis.
	23	38		IV. Sh. Eg.		23	17		I. Tr. Eg.		15	40		III. * Tr. Eg.
5	1	25		II. Tr. In.	9	16	30	14.9	III. Ec. Dis.		19	41		IV. Oc. Re.
	1	34		II. Sh. Eg.		16	45	59.1	I. Ec. Dis.		20	21	42.4	II. Ec. Dis.
	4	17		II. Tr. Eg.		20	0	15.9	III. Ec. Re.		1	54		II. Oc. Re.
	6	38		I. Sh. In.		20	25		I. Oc. Re.	14	3	0		I. Sh. In.
	7	53		IV. Tr. In.		22	1		III. Oc. Dis.		4	22		I. Tr. In.

In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance. \* Visible at Washington.

# 456 JUPITER'S SATELLITES, 1879.

## WASHINGTON MEAN TIME.

### June.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
14	5	20		I. Sh. Eg.	20	14	15		III.* Sh. Eg.	25	18	37		I. Oc. Re.	25	18	37		I. Oc. Re.
	6	41		I. Tr. Eg.		16	0		III. Tr. In.	26	6	29		II. Sh. In.		6	29		II. Sh. In.
15	0	11	26.7	I. Ec. Dis.		19	31		III. Tr. Eg.		9	2		II. Tr. In.		9	2		II. Tr. In.
	3	50		I. Oc. Re.		22	56	24.4	II. Ec. Dis.		9	23		II. Sh. Eg.		9	23		II. Sh. Eg.
	14	33		II.* Sh. In.	21	4	23		II. Oc. Re.		11	53		II.* Tr. Eg.		11	53		II.* Tr. Eg.
	17	16		II. Tr. In.		4	54		I. Sh. In.		12	19		I.* Sh. In.		12	19		I.* Sh. In.
	17	28		II. Sh. Eg.		6	14		I. Tr. In.		13	36		I.* Tr. In.		13	36		I.* Tr. In.
	20	7		II. Tr. Eg.		7	14		I. Sh. Eg.		14	39		I.* Sh. Eg.		14	39		I.* Sh. Eg.
	21	29		I. Sh. In.		8	33		I. Tr. Eg.		15	55		I.* Tr. Eg.		15	55		I.* Tr. Eg.
	22	50		I. Tr. In.		13	4		IV.* Sh. In.	27	9	31	6.2	I. Ec. Dis.		9	31		I. Ec. Dis.
	23	49		I. Sh. Eg.		17	48		IV. Sh. Eg.		13	4		I.* Oc. Re.		13	4		I.* Oc. Re.
16	1	9		I. Tr. Eg.	22	1	32		IV. Tr. In.		14	36		III.* Sh. In.		14	36		III.* Sh. In.
	18	39	59.3	I. Ec. Dis.		2	5	29.4	I. Ec. Dis.		18	15		III. Sh. Eg.		18	15		III. Sh. Eg.
	20	30	33.4	III. Ec. Dis.		5	41		I. Oc. Re.		19	47		III. Tr. In.		19	47		III. Tr. In.
	22	18		I. Oc. Re.		5	44		IV. Tr. Eg.		23	17		III. Tr. Eg.		23	17		III. Tr. Eg.
17	0	0	11.6	III. Ec. Re.		17	10		II. Sh. In.	28	1	31	2.3	II. Ec. Dis.		1	31		II. Ec. Dis.
	1	55		III. Oc. Dis.		19	47		II. Tr. In.		6	47		I. Sh. In.		6	47		I. Sh. In.
	5	27		III. Oc. Re.		20	5		II. Sh. Eg.		6	51		II. Oc. Re.		6	51		II. Oc. Re.
	9	39	2.8	II. Ec. Dis.		22	38		II. Tr. Eg.		8	4		I. Tr. In.		8	4		I. Tr. In.
	15	9		II.* Oc. Re.		23	22		I. Sh. In.		9	7		I. Sh. Eg.		9	7		I. Sh. Eg.
	15	57		I.* Sh. In.	23	0	41		I. Tr. In.		10	22		I. Tr. Eg.		10	22		I. Tr. Eg.
	17	18		I. Tr. In.		1	42		I. Sh. Eg.	29	3	59	36.0	I. Ec. Dis.		3	59		I. Ec. Dis.
	18	17		I. Sh. Eg.		3	0		I. Tr. Eg.		7	32		I. Oc. Re.		7	32		I. Oc. Re.
	19	37		I. Tr. Eg.		20	34	3.1	I. Ec. Dis.		19	47		II. Sh. In.		19	47		II. Sh. In.
18	13	8	26.1	I.* Ec. Dis.	24	0	9		I. Oc. Re.		20	42	48.6	IV. Ec. Dis.		20	42		IV. Ec. Dis.
	16	46		I. Oc. Re.		0	31	19.3	III. Ec. Dis.		22	17		II. Tr. In.		22	17		II. Tr. In.
19	3	52		II. Sh. In.		4	0	33.5	III. Ec. Re.		22	41		II. Sh. Eg.		22	41		II. Sh. Eg.
	6	32		II. Tr. In.		5	45		III. Oc. Dis.	30	1	8		II. Tr. Eg.		1	8		II. Tr. Eg.
	6	47		II. Sh. Eg.		9	16		III. Oc. Re.		1	10	49.6	IV. Ec. Re.		1	10		IV. Ec. Re.
	9	23		II. Tr. Eg.		12	13	43.3	II.* Ec. Dis.		1	16		I. Sh. In.		1	16		I. Sh. In.
	10	25		I. Sh. In.		17	37		II. Oc. Re.		2	31		I. Tr. In.		2	31		I. Tr. In.
	11	46		I. Tr. In.		17	50		I. Sh. In.		3	36		I. Sh. Eg.		3	36		I. Sh. Eg.
	12	45		I.* Sh. Eg.		19	9		I. Tr. In.		4	50		I. Tr. Eg.		4	50		I. Tr. Eg.
	14	5		I.* Tr. Eg.		20	10		I. Sh. Eg.		8	31		IV. Oc. Dis.		8	31		IV. Oc. Dis.
20	7	37	0.6	I. Ec. Dis.		21	28		I. Tr. Eg.		12	40		IV.* Oc. Re.		12	40		IV.* Oc. Re.
	10	36		III. Sh. In.	25	15	2	30.8	I.* Ec. Dis.		22	28	10.8	I. Ec. Dis.		22	28		I. Ec. Dis.
	11	14		I. Oc. Re.															

### July.

1	1	59	I.	Oc.	Re.	4	18	36	III.	Sh.	In.	8	8	31	43.9	III.	Ec.	Dis.		
	4	31	32.8	III.	Ec.	Dis.		22	15	III.	Sh.	Eg.		11	57	IV.*	Sh.	Eg.		
	8	0	21.8	III.	Ec.	Re.		23	29	III.	Tr.	In.		12	0	III.*	Ec.	Re.		
	9	30		III.	Oc.	Dis.	5	2	59	III.	Tr.	Eg.		13	9	III.*	Oc.	Dis.		
	12	59		III.*	Oc.	Re.		4	5	36.6	II.	Ec.	Dis.		16	38	III.	Oc.	Re.	
	14	48	19.7	II.	* Ec.	Dis.		8	41		I.	Sh.	In.		17	22	53.3	II.	Ec.	Dis.
	19	44		I.	Sh.	In.		9	16		II.	Oc.	Re.		18	10	IV.	Tr.	In.	
	20	3		II.	Oc.	Re.		9	53		I.	Tr.	In.		21	38	I.	Sh.	In.	
	20	59		I.	Tr.	In.		11	1		I.	* Sh.	Eg.		22	16	IV.	Tr.	Eg.	
	22	4		I.	Sh.	Eg.		12	11		I.	* Tr.	Eg.		22	27	II.	Oc.	Re.	
	23	17		I.	Tr.	Eg.		6	5	46.4	I.	Ec.	Dis.		22	47	I.	Tr.	In.	
2	16	56	39.2	I.	Ec.	Dis.		9	21		I.	Oc.	Re.		23	58	I.	Sh.	Eg.	
	20	27		I.	Oc.	Re.		22	24		II.	Sh.	In.	9	1	5	I.	Tr.	Eg.	
3	9	6		II.	Sh.	In.	7	0	44		II.	Tr.	In.		18	50	52.2	I.	Ec.	Dis.
	11	31		II.*	Tr.	In.		1	18		II.	Sh.	Eg.		22	15	I.	Oc.	Re.	
	12	0		II.*	Sh.	Eg.		3	10		I.	Sh.	In.	10	11	43	II.*	Sh.	In.	
	14	13		I.	* Sh.	In.		3	35		II.	Tr.	Eg.		13	57	II.*	Tr.	In.	
	14	22		II.*	Tr.	Eg.		4	20		I.	Tr.	In.		14	37	II.*	Sh.	Eg.	
	15	26		I.	* Tr.	In.		5	30		I.	Sh.	Eg.		16	7	I.	* Sh.	In.	
	16	33		I.	Sh.	Eg.		6	38		I.	Tr.	Eg.		16	48	II.	Tr.	Eg.	
	17	44		I.	Tr.	Eg.		8	0	22.7	I.	Ec.	Dis.		17	14	I.	Tr.	In.	
4	11	25	15.4	I.	Ec.	Dis.		3	48		I.	Oc.	Re.		18	26	I.	Sh.	Eg.	
	14	54		I.	* Oc.	Re.		7	17		IV.	Sh.	In.		19	32	I.	Tr.	Eg.	

NOTE.—For Phases of Eclipses see pages 464 and 465.

\* Visible at Washington.

Ec., denotes eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow;

# JUPITER'S SATELLITES, 1879. 457

## WASHINGTON MEAN TIME.

July.

d	h	m	s		d	h	m	s		d	h	m	s	
11	13	19	30.0	I. * Ec. Dis.	17	20	20		I. Sh. Eg.	24	23	6		I. Tr. Eg.
	16	42		I. Oc. Re.		21	20		I. Tr. Eg.	25	1	30		IV. Sh. In.
	22	37		III. Sh. In.	18	15	13	49.9	I. * Ec. Dis.		6	7		IV. Sh. Eg.
19	2	15		III. Sh. Tr. Eg.		18	30		I. Oc. Re.		9	51		IV. Tr. In.
	3	6		III. Tr. In.	19	2	37		III. Sh. In.		13	52		IV. * Tr. Eg.
	6	35		III. Tr. Eg.		6	15		III. Sh. Eg.		17	8	15.8	I. Ec. Dis.
	6	40	9.0	II. Ec. Dis.		6	39		III. Tr. In.		20	17		I. Oc. Re.
	10	35		I. * Sh. In.		9	14	41.4	II. Ec. Dis.	26	6	38		III. Sh. In.
	11	38		II. * Oc. Re.		10	8		III. * Tr. Eg.		10	8		III. * Tr. In.
	11	41		I. * Tr. In.		12	29		I. * Sh. In.		10	15		III. * Sh. Eg.
	12	55		I. * Sh. Eg.		13	28		I. * Tr. In.		11	49	15.6	II. * Ec. Dis.
	13	59		I. * Tr. Eg.		13	59		II. * Oc. Re.		13	36		III. * Tr. Eg.
18	7	48	2.1	I. Ec. Dis.		14	49		I. * Sh. Eg.		14	23		I. * Sh. In.
	11	10		I. * Oc. Re.		15	46		I. * Tr. Eg.		15	14		I. * Tr. In.
14	1	1		II. Sh. In.	20	9	42	23.5	I. Sh. Dis.		16	18		II. Oc. Re.
	3	9		II. Tr. In.		12	57		I. Oc. Re.		16	43		I. Sh. Eg.
	3	55		II. Sh. Eg.	21	3	38		II. Sh. In.		17	32		I. Tr. Eg.
	5	4		I. Sh. In.		5	32		II. Tr. In.	27	11	36	51.0	I. Ec. Dis.
	6	0		II. Tr. Eg.		6	32		II. Sh. Eg.		14	43		I. * Oc. Re.
	6	8		I. Tr. In.		6	57		I. Sh. In.	28	6	16		II. Sh. In.
	7	23		I. Sh. Eg.		7	54		I. Tr. In.		7	53		II. Tr. In.
	8	26		I. Tr. Eg.		8	23		II. Tr. Eg.		8	51		I. Sh. In.
15	2	16	39.8	I. Ec. Dis.		9	17		I. Sh. Eg.		9	9		II. Sh. Eg.
	5	37		I. Oc. Re.		10	13		I. * Tr. Eg.		9	40		I. * Tr. In.
	12	32	0.1	III. * Ec. Dis.	22	4	11	2.6	I. Ec. Dis.		10	44		II. * Tr. Eg.
	15	59	54.5	III. * Ec. Re.		7	24		I. Oc. Re.		11	11		I. * Sh. Eg.
	16	44		III. Oc. Dis.		16	32	30.7	III. Ec. Dis.		11	58		I. * Tr. Eg.
	19	57	25.8	II. Ec. Dis.		19	59	55.7	III. Ec. Re.	29	6	5	31.9	I. Ec. Dis.
	20	13		III. Oc. Re.		20	14		III. Oc. Dis.		9	10		I. Oc. Re.
	23	32		I. Sh. In.		22	31	58.9	II. Ec. Dis.		20	33	44.5	III. Ec. Dis.
16	0	35		I. Tr. In.		23	43		III. Oc. Re.	30	1	6	34.2	II. Ec. Dis.
	0	49		II. Oc. Re.	23	1	25		I. Sh. In.		3	9		III. Oc. Re.
	1	52		I. Sh. Eg.		2	21		I. Tr. In.		3	20		I. Sh. In.
	2	53		I. Tr. Eg.		3	9		II. Oc. Re.		4	6		I. Tr. In.
	14	55	2.0	IV. * Ec. Dis.		3	46		I. Sh. Eg.		5	27		II. Oc. Re.
	19	19	19.4	IV. Ec. Re.		4	40		I. Tr. Eg.		5	40		I. Sh. Eg.
	20	45	10.7	I. Ec. Dis.		22	89	35.1	I. Ec. Dis.		6	24		I. Tr. Eg.
17	0	3		I. Oc. Re.	24	1	50		I. Oc. Re.	31	0	34	5.8	I. Ec. Dis.
	0	39		IV. Oc. Dis.		16	57		II. Sh. In.		3	36		I. Oc. Re.
	4	42		IV. Oc. Re.		18	43		II. Tr. In.		19	35		II. Sh. In.
	14	20		II. * Sh. In.		19	51		II. Sh. Eg.		21	3		II. Tr. In.
	16	21		II. Tr. In.		19	54		I. Sh. In.		21	48		I. Sh. In.
	17	14		II. Sh. Eg.		20	47		I. Tr. In.		22	28		II. Sh. Eg.
	18	0		I. Sh. In.		21	34		II. Tr. Eg.		22	33		I. Tr. In.
	19	1		I. Tr. In.		22	14		I. Sh. Eg.		23	54		II. Tr. Eg.
	19	12		II. Tr. Eg.										

August.

1	0	8		I. Sh. Eg.	2	18	35		II. Oc. Re.	5	8	0	7.4	I. Ec. Dis.
	0	50		I. Tr. Eg.		18	37		I. Sh. Eg.		10	55		I. * Oc. Re.
	19	2	48.0	I. Ec. Dis.		19	17		I. Tr. Eg.	6	0	34	44.5	III. Ec. Dis.
	22	3		I. Oc. Re.		19	50		IV. Oc. Re.		3	41	12.4	II. Ec. Dis.
9	9	7	30.4	IV. Ec. Dis.	3	13	31	24.7	I. * Ec. Dis.		5	13		I. Sh. In.
	10	38		III. * Sh. In.		16	29		I. Oc. Re.		5	51		I. Tr. In.
	13	27	48.8	IV. * Ec. Re.	4	8	54		II. Sh. In.		6	32		III. Oc. Re.
	13	31		III. * Tr. In.		10	13		II. * Tr. In.		7	33		I. Sh. Eg.
	14	15		III. * Sh. Eg.		10	45		I. * Sh. In.		7	43		II. Oc. Re.
	14	23	52.2	II. Ec. Dis.		11	25		I. * Tr. In.		8	9		I. Tr. Eg.
	15	50		IV. * Oc. Dis.		11	47		II. * Sh. Eg.	7	2	28	43.0	I. Ec. Dis.
	16	17		I. Sh. In.		13	4		II. * Tr. Eg.		5	21		I. Oc. Re.
	16	59		I. Tr. In.		13	5		I. * Sh. Eg.		22	13		II. Sh. In.
	16	59		III. Tr. Eg.		13	43		I. * Tr. Eg.		23	22		II. Tr. In.

In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance. \* Visible at Washington.

# 458 JUPITER'S SATELLITES, 1879.

## WASHINGTON MEAN TIME.

### August.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
7	23	42		I. Sh. In.	15	22	52	14.6	I. Ec. Dis.	24	0	29		I. Tr. Eg.					
8	0	17		I. Tr. In.	16	1	32		I. Oc. Re.		1	18		II. Oc. Re.					
	1	6		II. Sh. Eg.		18	39		III. Sh. In.		2	15		III. Sh. Eg.					
	2	2		I. Sh. Eg.		19	33	20.4	II. Ec. Dis.		2	55		III. Tr. Eg.					
	2	13		II. Tr. Eg.		20	4		I. Sh. In.		19	15	49.9	I. Ec. Dis.					
	2	35		I. Tr. Eg.		20	10		III. Tr. In.		21	42		I. Oc. Re.					
	20	57	27.0	I. Ec. Dis.		20	27		I. Tr. In.		25	16	27	I. * Sh. In.					
	23	47		I. Oc. Re.		22	15		III. Sh. Eg.			16	36	I. * Tr. In.					
9	14	38		III. Sh. In.		22	24		I. Sh. Eg.			16	48	II. * Sh. In.					
	16	52		III. Tr. In.		22	45		I. Tr. Eg.			17	4	II. Tr. In.					
	16	58	33.2	II. Ec. Dis.		23	5		II. Oc. Re.			18	47	I. Sh. Eg.					
	18	10		I. Sh. In.		23	38		III. Tr. Eg.			18	54	I. Tr. Eg.					
	18	15		III. Sh. Eg.		17	17	20 54.2	I. Ec. Dis.			19	41	II. Sh. Eg.					
	18	43		I. Tr. In.			19	58	I. Oc. Re.			19	55	II. Tr. Eg.					
	20	20		III. Tr. Eg.		18	14	10	II. * Sh. In.		26	13	44 38.4	I. * Ec. Dis.					
	20	30		I. Sh. Eg.			14	33	I. * Sh. In.			16	8	I. * Oc. Re.					
	20	51		II. Oc. Re.			14	48	II. * Tr. In.		27	10	56	I. * Sh. In.					
	21	1		I. Tr. Eg.			14	53	I. * Tr. In.			11	1	I. * Tr. In.					
10	15	26	5.5	I. Ec. Dis.			16	53	I. Sh. Eg.			11	25	44.3	II. * Ec. Dis.				
	18	13		I. Oc. Re.			17	3	II. Sh. Eg.			12	38	20.3	III. * Ec. Dis.				
	19	45		IV. Sh. In.			17	11	I. Tr. Eg.			13	15	I. * Sh. Eg.					
11	0	17		IV. Sh. Eg.			17	39	II. Tr. Eg.			13	20	I. * Tr. Eg.					
	0	42		IV. Tr. In.		19	3	20 56.5	IV. Ec. Dis.			14	0	IV. * Sh. In.					
	4	42		IV. Tr. Eg.			10	18	IV. * Oc. Re.			14	25	II. * Oc. Re.					
	11	32		II. * Sh. In.			11	49	40.7	I. * Ec. Dis.		14	59	IV. * Tr. In.					
	12	31		II. * Tr. In.			14	24	I. * Oc. Re.			16	26	III. * Oc. Re.					
	12	39		I. * Sh. In.		20	8	37 17.1	III. * Ec. Dis.			18	28	IV. Sh. Eg.					
	13	9		I. * Tr. In.			8	50	46.3	II. * Ec. Dis.		19	2	IV. Tr. Eg.					
	14	25		II. * Sh. Eg.			9	1	I. * Sh. In.		28	8	13 19.4	I. Ec. Dis.					
	14	59		I. * Sh. Eg.			9	19	I. * Tr. In.			10	34	I. Oc. Re.					
	15	22		II. * Tr. Eg.			11	21	I. * Sh. Eg.		29	5	24	I. Sh. In.					
	15	27		I. * Tr. Eg.			11	37	I. * Tr. Eg.			5	27	I. Tr. In.					
12	9	54	50.2	I. * Ec. Dis.			12	11	II. * Oc. Re.			6	7	II. Sh. In.					
	12	39		I. * Oc. Re.			13	10	III. * Oc. Re.			6	12	I. Tr. In.					
13	4	36	14.8	III. Ec. Dis.		21	6	18 20.2	I. Ec. Dis.			7	44	I. * Sh. Eg.					
	6	15	56.6	II. Ec. Dis.			8	50	I. * Oc. Re.			7	46	I. * Tr. Eg.					
	7	7		I. Sh. In.		22	3	29	II. Sh. In.			9	0	II. * Sh. Eg.					
	7	35		I. Tr. In.			3	30	I. Sh. In.			9	3	II. * Tr. Eg.					
	9	27		I. * Sh. Eg.			3	45	I. Tr. In.		30	2	41	I. Oc. Dis.					
	9	52		III. * Oc. Re.			3	56	II. Tr. In.			5	0	I. Oc. Re.					
	9	53		I. * Tr. Eg.			5	50	I. Sh. Eg.			23	53	I. Tr. In.					
	9	58		II. * Oc. Re.			6	3	I. Tr. Eg.			23	53	I. Sh. In.					
14	4	23	27.6	I. Ec. Dis.			6	22	II. Sh. Eg.		31	0	40	I. Oc. Dis.					
	7	6		I. Oc. Re.			6	47	II. Tr. Eg.			2	12	II. Tr. Eg.					
15	0	51		II. Sh. In.		23	0	47 7.6	I. Ec. Dis.			2	12	I. Sh. Eg.					
	1	36		I. Sh. In.			3	16	I. Oc. Re.			2	41	III. Tr. In.					
	1	39		II. Tr. In.			21	58	I. Sh. In.			2	41	III. Sh. In.					
	2	1		I. Tr. In.			22	8	14.6	II. Ec. Dis.			3	31	II. Oc. Re.				
	3	44		II. Sh. Eg.			22	11	I. Tr. In.			6	10	III. Tr. Eg.					
	3	56		I. Sh. Eg.			22	40	III. Sh. In.			6	15	III. Sh. Eg.					
	4	19		I. Tr. Eg.			23	26	III. Tr. In.			21	7	I. Oc. Dis.					
	4	31		II. Tr. Eg.		24	0	18	I. Sh. Eg.			23	25	53.8	I. Ec. Re.				

### September.

1 18 19	I. Tr. In.	2 15 33	I. * Oc. Dis.	3 16 47 8.6	II. Ec. Ro.
18 22	I. Sh. In.	17 54 43.3	I. Ec. Re.	20 3 35.6	III. Ec. Ro.
19 20	II. Tr. In.	3 12 45	I. * Tr. In.	4 9 59	I. * Oc. Dis.
19 26	II. Sh. In.	12 50	I. * Sh. In.	12 23 24.8	I. * Ec. Re.
20 38	I. Tr. Eg.	13 47	II. * Oc. Dis.	20 23	IV. * Oc. Dis.
20 41	I. Sh. Eg.	15 4	I. * Tr. Eg.	5 1 46 37.8	IV. Ec. Ro.
22 11	II. Tr. Eg.	15 10	I. * Sh. Eg.	7 11	I. * Tr. In.
22 19	II. Sh. Eg.	16 12	III. * Oc. Dis.	7 19	I. * Sh. In.

NOTE.—For Phases of Eclipses see pages 464 and 465.

\* Visible at Washington.

Ec., denotes eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow;

## WASHINGTON MEAN TIME.

September.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
5	8	28		II. * Tr. In.	14	5	7		II. Oc. Dis.	22	23	32		I. Tr. In.	23	0	6		I. Sh. In.
	8	45		II. * Sh. In.		5	40		I. Tr. Eg.		0	6		I. Sh. In.		1	50		I. Tr. Eg.
	9	30		I. * Tr. Eg.		6	1		I. Sh. Eg.		1	50		I. Tr. In.		2	11		II. Tr. In.
	9	38		I. * Sh. Eg.		8	39	57.7	II. * Ec. Re.		2	11		I. Sh. Eg.		2	25		I. Sh. In.
	11	19		II. * Tr. Eg.		9	13		III. * Tr. In.		3	20		II. Sh. In.		5	3		II. Tr. Eg.
	11	38		II. * Sh. Eg.		10	43		III. * Sh. In.		5	3		II. Sh. Eg.		6	13		I. Oc. Dis.
6	4	25		I. Oc. Dis.		12	44		III. * Tr. Eg.		6	13		I. Oc. Dis.		20	47		I. Ec. Re.
	6	52	14.6	I. Ec. Re.		14	16		III. * Sh. Eg.		23	40	25.1	I. Tr. In.		18	34		I. Sh. In.
7	1	37		I. Tr. In.	15	0	36		I. Oc. Dis.		20	16		I. Tr. Eg.		20	30		I. Sh. Eg.
	1	48		I. Sh. In.		3	16	12.3	I. Ec. Re.		20	53		II. Ec. Re.		0	33	10.8	II. Oc. Dis.
	2	53		II. Oc. Dis.		21	47		I. Tr. In.		8	7	17.3	III. * Ec. Re.		15	14		I. Oc. Dis.
	3	56		I. Tr. Eg.		22	11		I. Sh. In.		18	9	11.9	I. Ec. Re.		12	24		I. * Tr. In.
	4	7		I. Sh. Eg.		23	53		II. Tr. In.		13	3		I. * Sh. In.		14	43		I. Tr. Eg.
	5	56		III. Tr. In.	16	0	6		I. Tr. Eg.		15	21		II. Tr. In.		15	22		I. Sh. Eg.
	6	4	42.8	II. Ec. Re.		0	30		I. Sh. Eg.		16	40		II. Sh. In.		16	40		II. Sh. In.
	6	41		III. Sh. In.		0	42		II. Sh. In.		18	13		III. Oc. Dis.		18	13		II. Tr. Eg.
	9	26		III. Tr. Eg.		2	45		II. Tr. Eg.		19	32		II. Sh. Eg.		19	32		II. Sh. Eg.
	10	16		III. Sh. Eg.		3	35		II. Sh. Eg.		12	38	6.1	I. * Ec. Re.		12	38		I. * Ec. Re.
	22	51		I. Oc. Dis.		19	2		I. Oc. Dis.		6	50		I. * Tr. In.		15	54		III. Tr. In.
8	1	20	59.5	I. Ec. Re.		21	45	5.0	I. Ec. Re.		7	32		I. * Sh. In.		18	47		III. Sh. In.
	20	3		I. Tr. In.	17	16	13		I. Tr. In.		9	10		I. * Tr. Eg.		19	26		III. Tr. Eg.
	20	16		I. Sh. In.		16	40		I. Sh. In.		9	38		II. * Oc. Dis.		22	19		III. Sh. Eg.
	21	36		II. Tr. In.		18	14		II. Oc. Dis.		9	50		I. * Sh. Eg.		7	6	55.6	I. * Ec. Re.
	22	4		II. Sh. In.		18	32		I. Tr. Eg.		13	51	2.4	II. * Ec. Re.		19	43		IV. Tr. In.
	22	22		I. Tr. Eg.		18	59		I. Sh. Eg.		15	54		III. Tr. In.		0	0		IV. Tr. Eg.
	22	35		I. Sh. Eg.		21	57	38.5	II. Ec. Re.		18	47		III. Sh. In.		1	17		I. Tr. In.
9	0	27		II. Tr. Eg.		22	46		III. Oc. Dis.		19	26		III. Tr. Eg.		2	0		I. Sh. In.
	0	57		II. Sh. Eg.	18	4	5	59.7	III. Ec. Re.		22	19		III. Sh. Eg.		2	33		IV. Sh. In.
	17	16		I. Oc. Dis.		13	28		I. * Oc. Dis.		7	6		I. * Ec. Re.		3	36		I. Tr. Eg.
	19	49	50.6	I. Ec. Re.		16	13	50.3	I. Ec. Re.		19	43		IV. Tr. In.		4	19		I. Sh. Eg.
10	14	29		I. * Tr. In.	19	10	40		I. * Tr. In.		0	0		IV. Tr. Eg.		4	31		II. Tr. In.
	14	45		I. * Sh. In.		11	8		I. * Sh. In.		1	17		I. Tr. In.		5	59		II. Sh. In.
	16	0		II. * Oc. Dis.		12	58		I. * Tr. Eg.		2	0		I. Sh. In.		6	51		IV. * Sh. Eg.
	16	48		I. Tr. Eg.		13	2		II. * Tr. In.		3	36		I. Tr. Eg.		7	23		II. * Tr. Eg.
	17	4		I. Sh. Eg.		13	27		I. * Sh. Eg.		4	19		I. Sh. Eg.		8	51		II. * Sh. Eg.
	19	22	17.9	II. Ec. Re.		14	1		II. * Sh. In.		5	31		I. Oc. Dis.		22	33		I. Oc. Dis.
	19	28		III. Oc. Dis.		15	54		II. Tr. Eg.		6	50		IV. Tr. In.					
11	0	4	25.4	III. Ec. Re.		16	54		II. Sh. Eg.		7	32		IV. Tr. Eg.					
	11	43		I. * Oc. Dis.	20	7	55		I. * Ec. Dis.		8	50		I. Tr. In.					
	14	18	34.3	I. * Ec. Re.		10	42	43.0	I. * Oc. Re.		9	10		I. * Tr. Eg.					
12	8	55		I. * Tr. In.	21	5	6		I. Tr. In.		9	38		II. * Oc. Dis.					
	9	14		I. * Sh. In.		5	37		I. Sh. In.		9	50		I. * Sh. Eg.					
	10	45		II. * Tr. In.		7	23		II. * Oc. Dis.		13	51	2.4	II. * Ec. Re.					
	11	14		I. * Tr. Eg.		7	24		I. * Tr. Eg.		15	54		III. Tr. In.					
	11	23		II. * Sh. In.		7	56		I. * Sh. Eg.		18	47		III. Sh. In.					
	11	33		I. * Sh. Eg.		10	36		IV. * Oc. Dis.		19	26		III. Tr. Eg.					
	13	36		II. * Tr. Eg.		11	15	24.3	II. * Ec. Re.		22	19		III. Sh. Eg.					
	14	16		II. * Sh. Eg.		12	32		III. * Tr. In.		7	6	55.6	I. * Ec. Re.					
13	5	10		IV. Tr. In.		14	45		III. * Sh. In.		19	43		IV. Tr. In.					
	6	10		I. Oc. Dis.		14	50		IV. * Oc. Re.		0	0		IV. Tr. Eg.					
	8	16		IV. * Sh. In.		15	51	35.9	IV. Ec. Dis.		1	17		I. Tr. In.					
	8	47	25.7	I. * Ec. Re.		16	3		III. Tr. Eg.		2	0		I. Sh. In.					
	9	20		IV. * Tr. Eg.		18	18		III. Sh. Eg.		3	36		I. Tr. Eg.					
	12	39		IV. * Sh. Eg.		19	56	44.7	IV. Ec. Re.		4	19		I. Sh. Eg.					
14	3	21		I. Tr. In.	22	2	21		I. Oc. Dis.		5	31		II. Tr. In.					
	3	42		I. Sh. In.		5	11	31.1	I. Ec. Re.		6	51		II. Sh. Eg.					

October.

1 1 35 51.1	I. Ec. Re.	1 22 47	II. Oc. Dis.	2 12 9 0.5	III.* Ec. Re.
19 43	I. Tr. In.	22 48	I. Sh. Eg.	17 0	I. Oc. Dis.
20 29	I. Sh. In.	2 3 8 55.2	II. Ec. Re.	20 4 39.1	I. Ec. Re.
22 3	I. Tr. Eg.	5 31	III. Oc. Dis.	2 14 10	I. * Tr. In.

In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance. \* Visible at Washington.

# 460 JUPITER'S SATELLITES, 1879.

## WASHINGTON MEAN TIME.

October.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
3	14	58		I. Sh. In.	13	2	23		III. Tr. Eg.	23	1	7		I. Tr. In.					
	16	29		I. Tr. Eg.		2	50		III. Sh. In.			2	15	I. Sh. In.					
	17	17		I. Sh. Eg.		6	21		III. Sh. Eg.			3	26	I. Tr. Eg.					
	17	42		II. Tr. In.		7	41		I. * Oc. Dis.			4	34	I. Sh. Eg.					
	19	18		II. Sh. In.		10	57	58.2	I. * Ec. Re.			5	52	II. Oc. Dis.					
	20	34		II. Tr. Eg.	14	4	51		I. Tr. In.			10	57	22.8	II. * Ec. Re.				
	22	10		II. Sh. Eg.		5	51		I. Sh. In.			16	7		III. Oc. Dis.				
4	11	27		I. * Oc. Dis.		7	10		I. * Tr. Eg.			19	42		III. Oc. Re.				
	14	33	34.3	I. Ec. Re.		8	10		I. * Sh. Eg.			20	53	32.0	III. Ec. Dis.				
5	8	36		I. * Tr. In.		9	16		II. * Tr. In.			22	26		I. Oc. Dis.				
	9	27		I. * Sh. In.		11	16		II. * Sh. In.			24	0	12	38.2	III. Ec. Re.			
	10	55		I. * Tr. Eg.		12	8		II. * Tr. Eg.				1	51	24.5	I. Ec. Re.			
	11	46		I. * Sh. Eg.		14	8		II. Sh. Eg.			17	15		IV. Oc. Dis.				
	11	57		II. * Oc. Dis.	15	2	9		I. Oc. Dis.			19	35		I. Tr. In.				
	16	26	52.7	II. Ec. Re.		5	26	55.8	I. Ec. Re.			20	44		I. Sh. In.				
	19	20		III. Tr. In.		23	18		I. Tr. In.			21	39		IV. Oc. Re.				
	22	48		III. Sh. In.	16	0	20		I. Sh. In.			21	54		I. Tr. Eg.				
	22	53		III. Tr. Eg.		1	37		I. Tr. Eg.			23	3		I. Sh. Eg.				
6	2	20		III. Sh. Eg.		2	39		I. Sh. Eg.			25	0	55	II. Tr. In.				
	5	54		I. Oc. Dis.		3	28		II. Oc. Dis.			3	14		II. Sh. In.				
	9	2	24.7	I. * Ec. Re.		8	21	1.2	II. * Ec. Re.			3	47		II. Tr. Eg.				
7	3	3		I. Tr. In.		11	3		IV. * Tr. In.			4	26	21.7	IV. Ec. Dis.				
	3	56		I. Sh. In.		12	30		III. * Oc. Dis.			6	6		II. Sh. Eg.				
	5	22		I. Tr. Eg.		15	25		IV. Tr. Eg.			8	19	8.9	IV. * Ec. Re.				
	6	15		I. Sh. Eg.		16	4		III. Oc. Re.			16	53		I. Oc. Dis.				
	6	53		II. * Tr. In.		16	51	30.2	III. Ec. Dis.			20	20	21.7	I. Ec. Re.				
	8	37		II. * Sh. In.		20	11	22.4	III. Ec. Re.			26	14	2	I. Tr. In.				
	9	45		II. * Tr. Eg.		20	36		I. Oc. Dis.			15	13		I. Sh. In.				
	11	30		II. * Sh. Eg.		20	51		IV. Sh. In.			16	21		I. Tr. Eg.				
8	0	21		I. Oc. Dis.		23	55	46.2	I. Oc. Re.			17	32		I. Sh. Eg.				
	1	28		IV. Oc. Dis.	17	1	3		IV. Sh. Eg.			19	5		II. Oc. Dis.				
	3	31	21.4	I. Ec. Re.		17	45		I. Tr. In.			27	0	15	36.0	II. Ec. Re.			
	5	47		IV. Oc. Re.		18	49		I. Sh. In.			6	3		III. Tr. In.				
	10	8	15.9	IV. * Ec. Dis.		20	4		I. Tr. Eg.			9	37		III. * Tr. Eg.				
	14	7	28.5	IV. Ec. Re.		21	8		I. Sh. Eg.			10	54		III. * Sh. In.				
	21	30		I. Tr. In.		22	29		II. Tr. In.			11	21		I. * Oc. Dis.				
	22	24		I. Sh. In.	18	0	35		II. Sh. In.			14	23		III. Sh. Eg.				
	23	49		I. Tr. Eg.		1	21		II. Tr. Eg.			14	49	14.4	I. Ec. Re.				
9	0	43		I. Sh. Eg.		3	27		II. Sh. Eg.			28	8	30	I. * Tr. In.				
	1	7		II. Oc. Dis.		15	3		I. Oc. Dis.			9	42		I. * Sh. In.				
	5	44	51.9	II. Ec. Re.		18	24	43.0	I. Ec. Re.			10	49		I. * Tr. Eg.				
	8	59		III. * Oc. Dis.	19	12	12		I. * Tr. In.			12	1		I. * Sh. Eg.				
	12	32		III. * Oc. Re.		13	17		I. Sh. In.			14	9		II. Tr. In.				
	12	49	36.4	III. * Ec. Dis.		14	31		I. Tr. Eg.			16	33		II. Sh. In.				
	16	10	13.2	III. Ec. Re.		15	36		I. Sh. Eg.			17	1		II. Tr. Eg.				
	18	47		I. Oc. Dis.		16	40		II. Oc. Dis.			19	25		II. Sh. Eg.				
	22	0	10.6	I. Ec. Re.		21	39	9.6	II. Ec. Re.			29	5	49	I. Oc. Dis.				
10	15	57		I. Tr. In.	20	2	23		III. Tr. In.			9	18	13.1	I. * Ec. Re.				
	16	53		I. Sh. In.		5	58		III. Tr. Eg.			20	2	57	I. Tr. In.				
	18	16		I. Tr. Eg.		6	52		III. * Sh. In.			4	10		I. Sh. In.				
	19	12		I. Sh. Eg.		9	31		I. * Oc. Dis.			5	17		I. Tr. Eg.				
	20	4		II. Tr. In.		10	22		III. * Sh. Eg.			6	30		I. * Sh. Eg.				
	21	57		II. Sh. In.		12	53	35.4	I. * Ec. Re.			8	19		II. * Oc. Dis.				
	22	56		II. Tr. Eg.	21	6	40		I. * Tr. In.			13	33	56.3	II. Ec. Re.				
11	0	49		II. Sh. Eg.		7	46		I. * Sh. In.			19	49		III. Oc. Dis.				
	13	14		I. * Oc. Dis.		8	59		I. * Tr. Eg.			23	24		III. Oc. Re.				
	16	29	6.7	I. Ec. Re.		10	5		I. * Sh. Eg.			21	0	17	I. Oc. Dis.				
12	10	24		I. * Tr. In.		11	42		II. * Tr. In.			0	55	45.5	III. Ec. Dis.				
	11	22		I. * Sh. In.		13	54		II. Sh. In.			3	47	4.8	I. Ec. Re.				
	12	43		I. * Tr. Eg.		14	34		II. Tr. Eg.			4	14	4.3	III. Ec. Re.				
	13	41		I. * Sh. Eg.		16	46		II. Sh. Eg.			21	25		I. Tr. In.				
	14	17		II. Oc. Dis.	22	3	58		I. Oc. Dis.			22	39		I. Sh. In.				
	18	2	54.9	II. Ec. Re.		7	22	33.6	I. Ec. Re.			23	45		I. Tr. Eg.				
	22	49		III. Tr. In.															

NOTE.—For Phases of Eclipses see pages 464 and 465.

\* Visible at Washington.

Ec., denotes eclipse; Oc., occultation; Tr., transit of the satellite; Sh., transit of the shadow;

# JUPITER'S SATELLITES, 1879. 461

## WASHINGTON MEAN TIME.

November.

d	h	m	s		d	h	m	s		d	h	m	s	
1	0	58		I. Sh. Eg.	10	14	32		IV. Oc. Re.	19	11	28		I. Oc. Dis.
	3	24		II. Tr. In.		15	5		I. Oc. Dis.		13	29		IV. Sh. Eg.
	5	52		II. Sh. In.		17	13		III. Tr. Eg.		15	5	17.6	I. Ec. Re.
	6	16		II. * Tr. Eg.		18	40	37.3	I. Ec. Re.	20	8	36		I. * Tr. In.
	8	44		II. * Sh. Eg.		18	59		III. Sh. In.		9	57		I. * Sh. In.
	18	45		I. Oc. Dis.		22	27		III. Sh. Eg.		10	55		I. Tr. Eg.
	22	16	2.2	I. Ec. Re.		22	44	39.3	IV. Ec. Dis.		12	15		I. Sh. Eg.
2	3	22		IV. Tr. In.	11	2	30	29.7	IV. Ec. Re.		15	54		II. Oc. Dis.
	7	48		IV. * Tr. Eg.		12	13		I. Tr. In.		21	24	44.1	II. Ec. Re.
	15	10		IV. Sh. In.		13	32		I. Sh. In.	21	5	57		I. * Oc. Dis.
	15	53		I. Tr. In.		14	34		I. Tr. Eg.		7	27		III. * Oc. Dis.
	17	8		I. Sh. In.		15	51		I. Sh. Eg.		9	34	9.6	I. * Ec. Re.
	18	13		I. Tr. Eg.		19	11		II. Tr. In.		11	2		III. * Oc. Re.
	19	16		IV. Sh. Eg.		21	50		II. Sh. In.		13	4	0.5	III. Ec. Dis.
	19	27		I. Sh. Eg.		22	5		II. Tr. Eg.		16	19	50.3	III. Ec. Re.
	21	33		II. Oc. Dis.	12	0	41		II. Sh. Eg.	22	3	5		I. Tr. In.
3	2	52	14.1	II. Ec. Re.		9	33		I. * Oc. Dis.		4	26		I. Sh. In.
	9	48		III. * Tr. In.		13	9	36.3	I. Ec. Re.		5	24		I. Tr. Eg.
	13	13		I. Oc. Dis.	13	6	42		I. * Tr. In.		6	44		I. * Sh. Eg.
	13	23		III. Tr. Eg.		8	1		I. * Sh. In.		11	4		II. * Tr. In.
	14	56		III. Sh. In.		9	2		I. * Tr. Eg.		13	47		II. Sh. In.
	16	44	55.4	I. Ec. Re.		10	20		I. * Sh. Eg.		13	57		II. Tr. Eg.
	18	25		III. Sh. Eg.		13	20		II. Oc. Dis.		16	38		II. Sh. Eg.
4	10	21		I. * Tr. In.		18	47	37.5	II. Ec. Re.	23	0	26		I. Oc. Dis.
	11	37		I. * Sh. In.	14	3	30		III. Oc. Dis.		4	3	6.4	I. Ec. Re.
	12	41		I. Tr. Eg.		4	2		I. Oc. Dis.		21	34		I. Tr. In.
	13	56		I. Sh. Eg.		7	5		III. * Oc. Re.		22	55		I. Sh. In.
	16	39		II. Tr. In.		7	38	28.4	I. * Ec. Re.		23	53		I. Tr. Eg.
	19	11		II. Sh. In.		9	1	10.1	III. * Ec. Dis.	24	1	13		I. Sh. Eg.
	19	32		II. Tr. Eg.		12	17	50.7	III. Ec. Re.		5	12		II. Oc. Dis.
	22	3		II. Sh. Eg.	15	1	10		I. Tr. In.		10	43	12.8	II. * Ec. Re.
5	7	41		I. * Oc. Dis.		2	30		I. Sh. In.		18	54		I. Oc. Dis.
	11	13	54.5	I. * Ec. Re.		3	30		I. Tr. Eg.		21	32		III. Tr. In.
6	4	49		I. Tr. In.		4	49		I. Sh. Eg.		22	31	59.3	I. Ec. Re.
	6	6		I. * Sh. In.		8	28		II. * Tr. In.	25	1	7		III. Tr. Eg.
	7	9		I. * Tr. Eg.		11	9		II. * Sh. In.		3	4		III. Sh. In.
	8	25		I. * Sh. Eg.		11	22		II. * Tr. Eg.		6	31		III. * Sh. Eg.
	10	48		II. * Oc. Dis.		14	0		II. Sh. Eg.		16	3		I. Tr. In.
	16	10	41.3	II. Ec. Re.		22	31		I. Oc. Dis.		17	24		I. Sh. In.
7	23	37		III. Oc. Dis.	16	2	7	25.8	I. Ec. Re.		18	22		I. Tr. Eg.
	2	9		I. Oc. Dis.		19	38		I. Tr. In.		19	42		I. Sh. Eg.
	3	12		III. Oc. Re.		20	59		I. Sh. In.	26	0	23		II. Tr. In.
	4	58	39.1	III. Ec. Dis.		21	59		I. Tr. Eg.		3	6		II. Sh. In.
	5	42	46.4	I. Ec. Re.		23	18		I. Sh. Eg.		3	16		II. Tr. Eg.
	8	16	9.5	III. * Ec. Re.	17	2	36		II. Oc. Dis.		5	57		II. * Sh. Eg.
	23	17		I. Tr. In.		8	6	3.1	II. * Ec. Re.		13	23		I. Oc. Dis.
8	0	35		I. Sh. In.		16	59		I. Oc. Dis.		17	0	57.5	I. Ec. Re.
	1	37		I. Tr. Eg.		17	33		III. Tr. In.	27	3	55		IV. Oc. Dis.
	2	54		I. Sh. Eg.		20	36	19.0	I. Ec. Re.		8	23		IV. * Oc. Re.
	5	55		II. Tr. In.		21	8		III. Tr. Eg.		10	32		I. * Tr. In.
	8	31		II. * Sh. In.		23	1		III. Sh. In.		11	53		I. Sh. In.
	8	48		II. * Tr. Eg.	18	2	20		III. Sh. Eg.		12	51		I. Tr. Eg.
	11	22		II. * Sh. Eg.		14	7		I. Tr. In.		14	11		I. Sh. Eg.
	20	37		I. Oc. Dis.		15	28		I. Sh. In.		17	3	32.8	IV. Ec. Dis.
9	0	11	43.9	I. Ec. Re.		16	27		I. Tr. Eg.		18	31		II. Oc. Dis.
	17	45		I. Tr. In.		17	47		I. Sh. Eg.		20	41	54.4	IV. Ec. Re.
	19	3		I. Sh. In.		20	44		IV. Tr. In.	28	0	2	0.9	II. Ec. Re.
	20	5		I. Tr. Eg.		21	46		II. Tr. In.		7	52		I. * Oc. Dis.
	21	22		I. Sh. Eg.	19	0	28		II. Sh. In.		11	20		III. Oc. Dis.
10	0	4		II. Oc. Dis.		0	39		II. Tr. Eg.		11	29	49.3	I. Ec. Re.
	5	29	3.1	II. Ec. Re.		1	12		IV. Tr. Eg.		15	4		III. Oc. Re.
	10	4		IV. * Oc. Dis.		3	19		II. Sh. Eg.		17	6	16.7	III. Ec. Dis.
	13	38		III. Tr. In.		9	30		IV. * Sh. In.		20	21	14.5	III. Ec. Re.

In, denotes ingress; Eg, egress; Dis, disappearance; Re, reappearance. \* Visible at Washington.



# 462 JUPITER'S SATELLITES, 1879.

WASHINGTON MEAN TIME.											
November.											
d	h	m	s	I.	Tr.	In.	d	h	m	s	I.
29	5	1		I.	Tr.	In.	29	13	42		II.
	6	22		I.	Sh.	In.					II.
	7	20		I.	Tr.	Eg.					II.
	8	40		I.	Sh.	Eg.					II.
December.											
1	0	51		I.	Sh.	In.	9	9	18		III.*
	1	50		I.	Tr.	Eg.		11	8		III.
	3	9		I.	Sh.	Eg.		14	33		III.
	7	50		II.	Sh.	In.		19	56		I.
	13	20	32.4	II.	Ec.	Re.		21	16		I.
	20	51		I.	Oc.	Dis.		22	15		I.
2	0	27	37.8	I.	Ec.	Re.		23	34		I.
	1	36		III.	Tr.	In.	10	5	41		II.*
	5	11		III.	Tr.	Eg.		8	20		II.*
	7	6		III.*	Sh.	In.		8	34		II.*
	10	32		III.*	Sh.	Eg.		11	12		II.
	17	59		I.	Tr.	In.		17	17		I.
	19	20		I.	Sh.	In.		20	52	11.3	I.
	20	19		I.	Tr.	Eg.	11	14	26		I.
	21	38		I.	Sh.	Eg.		15	44		I.
3	3	1		II.	Tr.	In.		16	45		I.
	5	43		II.	Sh.	In.		18	2		I.
	5	54		II.*	Tr.	Eg.		23	49		II.
	8	35		II.*	Sh.	Eg.	12	5	17	1.8	II.
	15	20		I.	Oc.	Dis.		11	47		I.
	18	56	35.5	I.	Ec.	Re.		15	21	2.2	I.
4	12	28		I.	Tr.	In.		19	44		III.
	13	49		I.	Sh.	In.		23	19		III.
	14	48		I.	Tr.	Eg.	13	1	10	37.2	III.
	16	7		I.	Sh.	Eg.		4	23	48.4	III.
	21	9		II.	Oc.	Dis.		8	55		I.
5	2	39	26.8	II.	Ec.	Re.		10	13		I.
	9	49		I.	Sh.	In.		11	14		I.
	13	25	27.0	I.	Ec.	Re.		12	31		I.
	15	4		IV.	Tr.	In.		19	2		II.
	15	34		III.	Oc.	Dis.		21	39		II.
	19	9		III.	Oc.	Re.		21	55		II.
	19	31		IV.	Tr.	Eg.		22	44		IV.
	21	8	24.9	III.	Ec.	Dis.	14	0	30		II.
6	0	22	29.9	III.	Ec.	Re.		3	10		IV.
	3	50		IV.	Sh.	In.		6	16		I.
	6	57		I.	Tr.	In.		9	49	56.7	I.
	7	41		IV.*	Sh.	Eg.		11	23	30.2	IV.
	8	18		I.	Sh.	In.		14	53	45.6	IV.
	9	17		I.	Tr.	Eg.	15	3	25		I.
	10	36		I.	Sh.	Eg.		4	42		I.
	16	21		II.	Tr.	In.		5	44		I.
	19	2		II.	Sh.	In.		7	0		I.
	19	14		II.	Tr.	Eg.		13	11		II.
	21	53		II.	Sh.	Eg.		18	35	37.8	II.
7	4	18		I.	Oc.	Dis.	16	0	46		I.
	7	54	22.4	I.	Ec.	Re.		4	18	47.9	I.
8	1	26		I.	Tr.	In.		9	55		III.
	2	47		I.	Sh.	In.		13	30		III.
	3	46		I.	Tr.	Eg.		15	11		III.
	5	5		I.	Sh.	Eg.		18	33		III.
	10	30		II.	Oc.	Dis.		21	55		I.
	15	58	0.8	II.	Ec.	Re.		23	11		I.
	22	48		I.	Oc.	Dis.	17	0	14		I.
9	2	23	14.3	I.	Ec.	Re.		1	29		I.
	5	44		III.*	Tr.	In.		8	23		II.*
30	2	21		I.	Ec.	Dis.	30	2	21		I.
	5	58	45.4	I.	Sh.	In.		5	58		I.
	23	30		I.	Tr.	In.		23	30		I.
17	10	58		II.	Sh.	In.	17	10	58		II.
	11	16		II.	Tr.	Eg.		11	16		II.
	13	49		II.	Sh.	Eg.		13	49		II.
	19	15		I.	Tr.	In.		19	15		I.
	22	47	43.8	I.	Sh.	In.		22	47		I.
18	16	24		I.	Tr.	Eg.	18	16	24		I.
	17	40		I.	Sh.	In.		17	40		I.
	18	43		I.	Tr.	Eg.		18	43		I.
	19	58		II.	Sh.	In.		19	58		II.
19	2	33		II.	Tr.	Eg.		2	33		II.
	7	54	44.9	II.	Sh.	Eg.		7	54		II.
	13	45		I.	Oc.	Dis.		13	45		I.
	17	16	33.9	I.	Ec.	Re.		17	16		I.
	23	58		I.	Tr.	In.		23	58		I.
20	3	32		I.	Sh.	In.	20	3	32		I.
	5	12	55.3	I.	Tr.	Eg.		5	12		I.
	8	25	11.5	I.	Sh.	Eg.		8	25		I.
	10	54		II.	Oc.	Dis.		10	54		II.
	12	9		II.	Ec.	Re.		12	9		II.
	13	13		I.	Oc.	Dis.		13	13		I.
	14	27		I.	Ec.	Re.		14	27		I.
	21	45		III.	Oc.	Dis.		21	45		III.
21	0	17		III.	Ec.	Re.	21	0	17		III.
	0	38		III.	Ec.	Dis.		0	38		III.
	3	7		III.	Ec.	Re.		3	7		III.
	8	15		I.	Tr.	In.		8	15		I.
	11	45	27.3	I.	Sh.	In.		11	45		I.
22	5	24		I.	Tr.	Eg.	22	5	24		I.
	6	38		I.	Sh.	Eg.		6	38		I.
	7	43		I.	Tr.	In.		7	43		I.
	8	56		I.	Sh.	Eg.		8	56		I.
	10	16		IV.	Tr.	In.		10	16		IV.
	14	40		IV.	Oc.	Dis.		14	40		IV.
	15	55		II.	Sh.	Eg.		15	55		II.
	21	13	22.3	IV.	Oc.	Re.		21	13		IV.
	22	10		I.	Sh.	In.		22	10		I.
23	1	53		I.	Ec.	Re.	23	1	53		I.
	2	44		IV.	Ec.	Dis.		2	44		IV.
	6	14	17.6	IV.	Ec.	Re.		6	14		IV.
	14	10		I.	Tr.	In.		14	10		I.
	17	44		I.	Sh.	In.		17	44		I.
	19	13		I.	Tr.	Eg.		19	13		I.
	22	36		I.	Sh.	Eg.		22	36		I.
	23	54		II.	Oc.	Dis.		23	54		II.
24	1	7		II.	Ec.	Re.	24	1	7		II.
	2	13		I.	Oc.	Dis.		2	13		I.
	3	25		I.	Ec.	Re.		3	25		I.
	11	7		III.	Tr.	In.		11	7		III.
	13	36		III.	Tr.	Eg.		13	36		III.
	14	0		III.	Sh.	In.		14	0		III.
	16	26		III.	Sh.	Eg.		16	26		III.
	21	14		I.	Tr.	In.		21	14		I.
25	0	43	12.4	I.	Sh.	In.	25	0	43		I.
	18	23		I.	Tr.	Eg.		18	23		I.
	19	36		I.	Sh.	In.		19	36		I.
	20	42		I.	Tr.	Eg.		20	42		I.

NOTE.—For Phases of Eclipses see pages 464 and 465.

\* Visible at Washington.

Ec denotes eclipse; Oc, occultation; Tr, transit of the satellite; Sh, transit of the shadow;

# JUPITER'S SATELLITES, 1879. 463

## WASHINGTON MEAN TIME.

### December.



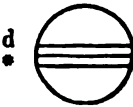
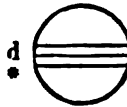



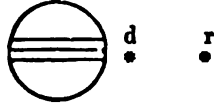

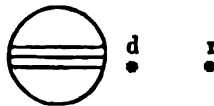


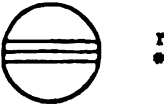







d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
25	21	54		I. Sh. Eg.	28	3	22		II. Tr. Eg.	30	22	40		IV. Oc. Re.					
26	5	18		II. Oc. Dis.		5	44		II. * Sh. Eg.		23	16		III. Sh. In.					
	10	32	34.9	II. Ec. Re.		10	14		I. Oc. Dis.	31	1	53		I. Tr. In.					
	15	44		I. Oc. Dis.		13	40	54.0	I. Ec. Re.		2	38		III. Sh. Eg.					
	19	12	1.8	I. Ec. Re.	29	7	23		I. * Tr. In.		3	3		I. Sh. In.					
27	4	14		III. Oc. Dis.		8	34		I. * Sh. In.		4	12		I. Tr. Eg.					
	7	47		III. * Oc. Re.		9	42		I. Tr. Eg.		5	21		I. Sh. Eg.					
	9	15	49.3	III. * Ec. Dis.		10	52		I. Sh. Eg.		5	43	6.6	IV. * Ec. Dis.					
	12	27	9.5	III. Ec. Re.		18	40		II. Oc. Dis.		9	4	39.2	IV. Ec. Re.					
	12	53		I. Tr. In.		23	51	13.6	II. Ec. Re.		13	52		II. Tr. In.					
	14	5		I. Sh. In.	30	4	44		I. Oc. Dis.		16	13		II. Sh. In.					
	15	12		I. Tr. Eg.		8	9	43.4	I. * Ec. Re.		16	44		II. Tr. Eg.					
	16	23		I. Sh. Eg.		18	18		IV. Oc. Dis.		19	3		II. Sh. Eg.					
28	0	29		II. Tr. In.		18	29		III. Tr. In.		23	14		I. Oc. Dis.					
	2	54		II. Sh. In.		22	3		III. Tr. Eg.										

# **464 JUPITER'S SATELLITES, 1879.**

PHASES OF THE ECLIPSES OF THE SATELLITES FOR AN INVERTING TELESCOPE.					
March.					
I.	d •		III.	d •	
II.	d •		IV.	d •	r •
April.					
I.	d •		III.	d •	r •
II.	d •		IV.	d •	r •
May.					
I.	d •		III.	d •	r •
II.	d •		IV.	d •	r •
June.					
I.	d •		III.	d •	r •
II.	d •		IV.	d •	r •
July.					
I.	d •		III.	d •	r •
II.	d •		IV.	d •	r •

NOTE.—Each diagram is given for the eclipse which occurs nearest the middle of the month.

# JUPITER'S SATELLITES, 1879. 465

PHASES OF THE ECLIPSES OF THE SATELLITES FOR AN INVERTING TELESCOPE.			
<b>August.</b>			
I.		III.	
II.		IV.	
<b>September.</b>			
I.		III.	
II.		IV.	
<b>October.</b>			
I.		III.	
II.		IV.	
<b>November.</b>			
I.		III.	
II.		IV.	
<b>December.</b>			
I.		III.	
II.		IV.	

NOTE.—Each diagram is given for the eclipse which occurs nearest the middle of the month.

# 466 JUPITER'S SATELLITES, 1879.

WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE I.

Jan.	1	10 27.2	May	16	0 34.9	Aug.	1	20 53.4	Oct.	18	16 12.8
	3	4 57.6		17	19 3.8		3	15 19.6		20	10 40.2
	4	23 27.9		19	13 32.8		5	9 45.9		22	5 7.8
	6	17 58.3		21	8 1.6		7	4 11.9		23	23 35.3
	8	12 28.7		23	2 30.5		8	22 38.1		25	18 2.9
Mar.	7	23 13.5		24	20 59.2		10	17 4.1		27	12 30.6
	9	17 43.6		26	15 28.0		12	11 30.2		29	6 53.4
	11	12 14.1		28	9 56.6		14	5 56.3		31	1 26.2
	13	6 44.5		30	4 25.4		16	0 22.4	Nov.	1	19 54.2
	15	1 14.7		31	22 53.9		17	18 48.5		3	14 22.2
	16	19 44.9	June	2	17 22.4		19	13 14.6		5	8 50.4
	18	14 15.1		4	11 50.8		21	7 40.7		7	3 18.5
	20	8 45.3		6	6 19.2		23	2 6.9		8	21 46.7
	22	3 15.5		8	0 47.5		24	20 32.9		10	16 15.0
	23	21 45.6		9	19 15.8		26	14 58.0		12	10 43.5
	25	16 15.7		11	13 43.9		28	9 24.8		14	5 11.9
	27	10 45.8		13	8 12.1		30	3 50.8		15	23 40.5
	29	5 15.7		15	2 40.2		31	22 16.7		17	18 9.0
	30	23 45.9		16	21 8.2	Sept.	2	16 42.7		19	12 37.7
April	1	18 15.8		18	15 36.0		4	11 8.6		21	7 6.4
	3	12 45.0		20	10 4.0		6	5 34.7		23	1 35.2
	5	7 15.8		22	4 31.8		8	0 0.7		24	20 4.0
	7	1 45.7		23	22 59.6		9	18 26.9		26	14 33.0
	8	20 15.6		25	17 27.1		11	12 52.9		28	9 2.0
	10	14 45.5		27	11 54.8		13	7 19.1		30	3 31.1
	12	9 15.3		29	6 22.3		15	1 45.2	Dec.	1	22 0.2
	14	3 45.0	July	1	0 49.8		16	20 11.5		3	16 29.5
	15	22 14.8		2	19 17.2		18	14 37.6		5	10 58.7
	17	16 44.6		4	13 44.6		20	9 4.0		7	5 28.0
	19	11 14.3		6	8 11.8		22	3 30.3		8	23 57.3
	21	5 44.1		8	2 39.0		23	21 56.7		10	18 26.8
	23	0 13.6		9	21 6.1		25	16 23.1		12	12 56.1
	24	18 43.2		11	15 33.2		27	10 49.7		14	7 25.7
	26	13 12.7		13	10 0.2		29	5 16.2		16	1 55.2
	28	7 42.2		15	4 27.2		30	23 42.8		17	20 24.9
	30	2 11.6		16	22 54.1	Oct.	2	18 9.4		19	14 54.5
May	1	20 41.0		18	17 20.9		4	12 36.3		21	9 24.2
	3	15 10.4		20	11 47.7		6	7 3.0		23	3 54.0
	5	9 39.8		22	6 14.4		8	1 30.0		24	22 23.8
	7	4 9.0		24	0 40.9		9	19 56.9		26	16 53.7
	8	22 38.3		25	19 7.6		11	14 24.0		28	11 23.6
	10	17 7.5		27	13 34.1		13	8 51.0		30	5 53.5
	12	11 36.7		29	8 0.7		15	3 18.3			
	14	6 5.8		31	2 27.0		16	21 45.5			

## SATELLITE II.

		<sup>h</sup> <sub>m</sub>		<sup>h</sup> <sub>m</sub>		<sup>h</sup> <sub>m</sub>		<sup>h</sup> <sub>m</sub>			
Jan.	1	8 27.1	Mar.	20	16 4.6	April	11	0 30.5	May	2	8 44.8
	4	21 52.7		24	5 29.1		14	13 53.6		5	22 5.9
	8	11 19.5		27	18 54.3		18	3 16.8		9	11 27.0
Mar.	9	23 48.0		31	8 18.4		21	16 39.1		13	0 47.2
	13	13 14.2	April	3	21 42.9		25	6 1.5		16	14 7.1
	17	2 39.2		7	11 6.3		28	19 23.1		20	3 26.0

# JUPITER'S SATELLITES, 1879. 467

WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE II.

May 23	<sup>h</sup> 16 <sup>m</sup> 45.0	July 19	<sup>h</sup> 12 <sup>m</sup> 34.1	Sept. 14	<sup>h</sup> 6 <sup>m</sup> 32.6	Nov. 10	<sup>h</sup> 1 <sup>m</sup> 29.9
27	6 3.3	23	1 43.7	17	19 39.9	13	14 46.1
30	19 21.2	26	14 52.8	21	8 47.6	17	4 2.9
June 3	8 38.6	30	4 1.5	24	21 55.6	20	17 20.4
6	21 55.5	Aug. 2	17 9.9	28	11 4.1	24	6 38.3
10	11 11.7	6	6 17.8	Oct. 2	0 13.1	27	19 57.0
14	0 27.5	9	19 25.3	5	13 22.5	Dec. 1	9 16.0
17	13 42.7	13	8 32.4	9	2 32.6	4	22 35.9
21	2 57.4	16	21 39.4	12	15 43.1	8	11 56.0
24	16 11.4	20	10 46.1	16	4 54.2	12	1 16.9
28	5 25.0	23	23 52.6	19	18 6.0	15	14 37.8
July 1	18 37.9	27	12 59.2	23	7 18.3	19	3 59.7
5	7 50.2	31	2 5.7	26	20 31.4	22	17 21.5
8	21 1.9	Sept. 3	15 12.2	30	9 45.0	26	6 44.2
12	10 13.1	7	4 18.9	Nov. 2	22 59.3	29	20 6.8
15	23 23.9	10	17 25.6	6	12 14.4		

## SATELLITE III.

Jan. 2	<sup>h</sup> 23 <sup>m</sup> 40.4	May 19	<sup>h</sup> 11 <sup>m</sup> 42.9	Aug. 6	<sup>h</sup> 4 <sup>m</sup> 48.2	Oct. 23	<sup>h</sup> 17 <sup>m</sup> 54.3
Mar. 8	16 17.7	26	15 48.2	13	8 8.3	30	21 36.5
15	20 46.9	June 2	19 49.6	20	11 25.4	Nov. 7	1 24.6
23	1 14.6	9	23 47.6	27	14 41.4	14	5 17.2
30	5 40.7	17	3 41.0	Sept. 3	17 56.7	21	9 14.8
April 6	10 4.8	24	7 30.3	10	21 13.5	28	13 16.4
13	14 27.1	July 1	11 14.5	18	0 31.4	Dec. 5	17 21.9
20	18 48.1	8	14 53.7	25	3 52.3	12	21 31.4
27	23 6.1	15	18 28.3	Oct. 2	7 17.2	20	1 44.7
May 5	3 22.0	22	21 58.7	9	10 45.2	27	6 0.5
12	7 34.1	30	1 25.4	16	14 17.1		

## SATELLITE IV.

Mar. 21	<sup>h</sup> 16 <sup>m</sup> 43.8	June 13	<sup>h</sup> 17 <sup>m</sup> 32.1	Sept. 4	<sup>h</sup> 22 <sup>m</sup> 25.9	Nov. 10	<sup>h</sup> 12 <sup>m</sup> 18.0
Apr. 7	13 10.9	30	10 35.7	21	12 42.6	27	6 9.1
24	9 14.0	July 17	2 40.6	Oct. 8	3 37.7	Dec. 14	0 56.7
May 11	4 43.5	Aug. 2	17 50.4	24	19 26.8	31	20 29.0
27	23 32.3	19	8 17.2				

In the following Tables  $x$  and  $y$  are the rectangular coördinates for each Satellite, referred to the centre of the primary and the major and minor axes of the apparent ellipse described by the Satellite.  $x$  is positive on the *east* side of the planet; negative on the *west* side.  $y$  is positive when *north*; negative when *south*.

$x'$  and  $y'$  are the coördinates which correspond to a constant value of the major axis and maximum value of the minor axis, as seen from the sun at its mean distance.

The factors by which  $x'$  and  $y'$  must be multiplied to obtain the coördinates  $x$  and  $y$  at any time, are given for each Satellite on pages 472 and 473.

$p$  is the inclination of the minor axis of the apparent ellipse to the circle of declination; reckoned from the *north*, + towards the *east*.

COORDINATES IN THE MEAN APPARENT ELLIPSE DESCRIBED BY THE  
SATELLITE, AND FOR THE MEAN DISTANCE OF JUPITER  
FROM THE SUN, FOR THE ( $t$ ) TIME AFTER GEO-  
CENTRIC SUPERIOR CONJUNCTION.

## SATELLITE I.

$t$	$x'$	$y'$	$t$	$x'$	$y'$	$t$	$x'$	$y'$
d h m			d h m			d h m		
0 0 0	+ 0.0	+ 6.6	0 15 0	+ 87.1	- 4.0	1 6 0	-105.1	- 1.8
0 0 20	5.4	6.6	0 15 20	83.7	4.3	1 6 20	106.4	1.5
0 0 40	10.8	6.6	0 15 40	80.1	4.5	1 6 40	107.5	1.2
0 1 0	16.1	6.6	0 16 0	76.4	4.7	1 7 0	108.3	0.8
0 1 20	21.4	6.5	0 16 20	72.5	5.0	1 7 20	108.8	0.5
0 1 40	26.6	6.4	0 16 40	68.4	5.2	1 7 40	109.1	- 0.2
0 2 0	+ 31.8	+ 6.3	0 17 0	+ 64.1	- 5.4	1 8 0	-109.1	+ 0.1
0 2 20	36.9	6.2	0 17 20	59.6	5.5	1 8 20	108.9	0.5
0 2 40	42.0	6.1	0 17 40	55.0	5.7	1 8 40	108.4	0.8
0 3 0	46.9	6.0	0 18 0	50.3	5.9	1 9 0	107.6	1.1
0 3 20	51.7	5.8	0 18 20	45.5	6.0	1 9 20	106.6	1.4
0 3 40	56.4	5.7	0 18 40	40.5	6.1	1 9 40	105.3	1.8
0 4 0	+ 60.9	+ 5.5	0 19 0	+ 35.5	- 6.3	1 10 0	-103.8	+ 2.1
0 4 20	65.3	5.3	0 19 20	30.4	6.4	1 10 20	102.0	2.4
0 4 40	69.5	5.1	0 19 40	25.2	6.4	1 10 40	99.9	2.7
0 5 0	73.6	4.9	0 20 0	19.9	6.5	1 11 0	97.6	3.0
0 5 20	77.5	4.7	0 20 20	14.6	6.6	1 11 20	95.1	3.3
0 5 40	81.2	4.4	0 20 40	9.2	6.6	1 11 40	92.3	3.5
0 6 0	+ 84.7	+ 4.2	0 21 0	+ 3.8	- 6.6	1 12 0	- 89.3	+ 3.8
0 6 20	88.0	3.9	0 21 20	- 1.5	6.6	1 12 20	86.1	4.1
0 6 40	91.1	3.7	0 21 40	6.9	6.6	1 12 40	82.7	4.3
0 7 0	94.0	3.4	0 22 0	12.3	6.6	1 13 0	79.1	4.6
0 7 20	96.6	3.1	0 22 20	17.6	6.5	1 13 20	75.3	4.8
0 7 40	99.0	2.8	0 22 40	22.9	6.5	1 13 40	71.3	5.0
0 8 0	+101.1	+ 2.5	0 23 0	- 28.1	- 6.4	1 14 0	- 67.1	+ 5.2
0 8 20	103.0	2.2	0 23 20	33.3	6.3	1 14 20	62.8	5.4
0 8 40	104.7	1.9	0 23 40	38.4	6.2	1 14 40	58.3	5.6
0 9 0	106.1	1.6	1 0 0	43.4	6.1	1 15 0	53.7	5.8
0 9 20	107.3	1.3	1 0 20	48.3	5.9	1 15 20	49.0	5.9
0 9 40	108.1	0.9	1 0 40	53.1	5.8	1 15 40	44.1	6.1
0 10 0	+108.7	+ 0.6	1 1 0	- 57.7	- 5.6	1 16 0	- 39.1	+ 6.2
0 10 20	109.1	+ 0.3	1 1 20	62.2	5.4	1 16 20	34.0	6.3
0 10 40	109.1	- 0.1	1 1 40	66.6	5.2	1 16 40	28.9	6.4
0 11 0	109.0	0.4	1 2 0	70.8	5.0	1 17 0	23.7	6.5
0 11 20	108.6	0.7	1 2 20	74.8	4.8	1 17 20	18.4	6.5
0 11 40	107.9	1.0	1 2 40	78.6	4.6	1 17 40	13.0	6.6
0 12 0	+106.9	- 1.3	1 3 0	- 82.2	- 4.4	1 18 0	- 7.7	+ 6.6
0 12 20	105.7	1.7	1 3 20	85.6	4.1	1 18 20	- 2.3	6.6
0 12 40	104.2	2.0	1 3 40	88.9	3.8	1 18 40	+ 3.1	6.6
0 13 0	102.5	2.3	1 4 0	91.9	3.6	1 19 0	8.5	6.6
0 13 20	100.5	2.6	1 4 20	94.7	3.3	1 19 20	13.8	6.6
0 13 40	98.3	2.9	1 4 40	97.3	3.0	1 19 40	19.1	6.5
0 14 0	+ 95.8	- 3.2	1 5 0	- 99.6	- 2.7	1 20 0	+ 24.4	+ 6.5
0 14 20	93.1	3.5	1 5 20	101.7	2.4			
0 14 40	+ 90.2	- 3.7	1 5 40	-103.5	- 2.1			

## COORDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE II.

<i>t</i>	<i>z'</i>	<i>y'</i>	<i>t</i>	<i>z'</i>	<i>y'</i>	<i>t</i>	<i>z'</i>	<i>y'</i>
d h m			d h m			d h m		
0 0 0	+ 0.0	+12.2	1 6 0	+139.5	- 7.3	2 12 0	-166.4	- 3.5
0 0 40	8.5	12.2	1 6 40	134.2	7.7	2 12 40	168.6	2.9
0 1 20	17.0	12.1	1 7 20	128.6	8.2	2 13 20	170.4	2.3
0 2 0	25.5	12.1	1 8 0	122.7	8.6	2 14 0	171.9	1.8
0 2 40	33.9	12.0	1 8 40	116.5	9.0	2 14 40	173.0	1.2
0 3 20	42.2	11.8	1 9 20	110.1	9.4	2 15 20	173.6	- 0.6
0 4 0	+ 50.5	+11.7	1 10 0	+103.4	- 9.8	2 16 0	-173.8	0.0
0 4 40	58.6	11.5	1 10 40	96.4	10.1	2 16 40	173.6	+ 0.6
0 5 20	66.5	11.3	1 11 20	89.2	10.5	2 17 20	172.9	1.2
0 6 0	74.3	11.0	1 12 0	81.7	10.8	2 18 0	171.8	1.8
0 6 40	81.9	10.8	1 12 40	74.1	11.0	2 18 40	170.3	2.4
0 7 20	89.4	10.5	1 13 20	66.3	11.3	2 19 20	168.4	3.0
0 8 0	+ 96.6	+10.1	1 14 0	+ 58.3	-11.5	2 20 0	-166.2	+ 3.5
0 8 40	103.6	9.8	1 14 40	50.2	11.7	2 20 40	163.5	4.1
0 9 20	110.3	9.4	1 15 20	42.0	11.8	2 21 20	160.4	4.7
0 10 0	116.7	9.0	1 16 0	33.7	12.0	2 22 0	156.9	5.2
0 10 40	122.9	8.6	1 16 40	25.3	12.1	2 22 40	153.0	5.8
0 11 20	128.8	8.2	1 17 20	16.8	12.1	2 23 20	148.8	6.3
0 12 0	+134.4	+ 7.7	1 18 0	+ 8.3	-12.2	3 0 0	-144.2	+ 6.8
0 12 40	139.6	7.3	1 18 40	- 0.2	12.2	3 0 40	139.3	7.3
0 13 20	144.5	6.8	1 19 20	8.8	12.2	3 1 20	134.1	7.8
0 14 0	149.0	6.3	1 20 0	17.3	12.1	3 2 0	128.5	8.2
0 14 40	153.2	5.7	1 20 40	25.7	12.1	3 2 40	122.6	8.6
0 15 20	157.0	5.2	1 21 20	34.1	12.0	3 3 20	116.4	9.0
0 16 0	+160.5	+ 4.7	1 22 0	- 42.4	-11.8	3 4 0	-109.9	+ 9.4
0 16 40	163.6	4.1	1 22 40	50.6	11.7	3 4 40	103.1	9.8
0 17 20	166.3	3.5	1 23 20	58.7	11.5	3 5 20	96.1	10.1
0 18 0	168.6	3.0	2 0 0	66.7	11.3	3 6 0	88.9	10.5
0 18 40	170.5	2.4	2 0 40	74.5	11.0	3 6 40	81.5	10.8
0 19 20	171.9	1.8	2 1 20	82.1	10.7	3 7 20	73.9	11.0
0 20 0	+172.9	+ 1.2	2 2 0	- 89.5	-10.4	3 8 0	- 66.1	+11.3
0 20 40	173.6	+ 0.6	2 2 40	96.7	10.1	3 8 40	58.1	11.5
0 21 20	173.8	0.0	2 3 20	103.7	9.8	3 9 20	50.0	11.7
0 22 0	173.6	- 0.6	2 4 0	110.4	9.4	3 10 0	41.8	11.8
0 22 40	172.9	1.2	2 4 40	116.8	9.0	3 10 40	33.5	12.0
0 23 20	171.8	1.8	2 5 20	123.0	8.6	3 11 20	25.1	12.1
1 0 0	+170.4	- 2.4	2 6 0	-128.9	- 8.2	3 12 0	- 16.6	+12.1
1 0 40	168.5	3.0	2 6 40	134.5	7.7	3 12 40	- 8.1	12.2
1 1 20	166.2	3.5	2 7 20	139.7	7.2	3 13 20	+ 0.4	12.2
1 2 0	163.5	4.1	2 8 0	144.6	6.7	3 14 0	9.0	12.2
1 2 40	160.4	4.7	2 8 40	149.1	6.2	3 14 40	17.5	12.1
1 3 20	157.0	5.2	2 9 20	153.3	5.7	3 15 20	26.0	12.1
1 4 0	+153.2	- 5.8	2 10 0	-157.1	- 5.2	3 16 0	+ 34.4	+12.0
1 4 40	149.0	6.3	2 10 40	160.6	4.6			
1 5 20	+144.4	- 6.8	2 11 20	-163.7	- 4.1			



## COORDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE III.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>		<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d h m	+ 0.0	+17.4	d h m	+225.4	-10.1	h d m	-262.3	- 5.6
0 0 0	13.5	17.4	2 12 0	217.3	10.8	5 0 0	266.4	4.8
0 1 20	26.9	17.3	2 13 20	208.6	11.5	5 1 20	269.8	4.0
0 2 40	40.3	17.2	2 14 40	199.5	12.1	5 2 40	272.6	3.2
0 4 0	53.6	17.1	2 16 0	189.9	12.7	5 4 0	274.7	2.3
0 5 20	66.8	16.9	2 17 20	179.9	13.3	5 5 20	276.2	1.5
0 6 40			2 18 40			5 6 40		
0 8 0	+ 79.8	+16.7	2 20 0	+169.4	-13.8	5 8 0	-277.0	- 0.6
0 9 20	92.7	16.4	2 21 20	158.5	14.3	5 9 20	277.2	+ 0.2
0 10 40	105.3	16.1	2 22 40	147.2	14.8	5 10 40	276.7	1.1
0 12 0	117.6	15.8	3 0 0	135.6	15.2	5 12 0	275.5	1.9
0 13 20	129.7	15.4	3 1 20	123.7	15.6	5 13 20	273.7	2.7
0 14 40	141.5	15.0	3 2 40	111.5	16.0	5 14 40	271.2	3.6
0 16 0	+153.0	+14.5	3 4 0	+ 99.0	-16.3	5 16 0	-268.1	+ 4.4
0 17 20	164.1	14.0	3 5 20	86.3	16.6	5 17 20	264.4	5.2
0 18 40	174.7	13.5	3 6 40	73.3	16.8	5 18 40	260.1	6.0
0 20 0	184.9	13.0	3 8 0	60.2	17.0	5 20 0	255.1	6.8
0 21 20	194.7	12.4	3 9 20	47.0	17.2	5 21 20	249.5	7.6
0 22 40	204.1	11.8	3 10 40	33.6	17.3	5 22 40	243.3	8.3
1 0 0	+213.0	+11.1	3 12 0	+ 20.2	-17.4	6 0 0	-236.6	+ 9.1
1 1 20	221.4	10.5	3 13 20	+ 6.7	17.4	6 1 20	229.3	9.8
1 2 40	229.3	9.8	3 14 40	- 6.8	17.4	6 2 40	221.4	10.5
1 4 0	236.6	9.1	3 16 0	20.3	17.4	6 4 0	213.0	11.1
1 5 20	243.3	8.3	3 17 20	33.7	17.3	6 5 20	204.1	11.8
1 6 40	249.5	7.6	3 18 40	47.1	17.2	6 6 40	194.7	12.4
1 8 0	+255.1	+ 6.8	3 20 0	- 60.3	-17.0	6 8 0	-184.9	+13.0
1 9 20	260.0	6.0	3 21 20	73.4	16.8	6 9 20	174.7	13.5
1 10 40	264.3	5.2	3 22 40	86.3	16.6	6 10 40	164.1	14.0
1 12 0	268.0	4.4	4 0 0	99.0	16.3	6 12 0	153.0	14.5
1 13 20	271.1	3.6	4 1 20	111.5	16.0	6 13 20	141.5	15.0
1 14 40	273.6	2.7	4 2 40	123.7	15.6	6 14 40	129.7	15.4
1 16 0	+275.5	+ 1.9	4 4 0	-135.7	-15.2	6 16 0	-117.6	+15.8
1 17 20	276.7	1.1	4 5 20	147.2	14.8	6 17 20	105.2	16.1
1 18 40	277.2	+ 0.2	4 6 40	158.4	14.3	6 18 40	92.6	16.4
1 20 0	277.0	- 0.6	4 8 0	169.3	13.8	6 20 0	79.8	16.7
1 21 20	276.2	1.5	4 9 20	179.8	13.3	6 21 20	66.8	16.9
1 22 40	274.7	2.3	4 10 40	189.9	12.7	6 22 40	53.6	17.1
2 0 0	+272.6	- 3.2	4 12 0	-199.5	-12.1	7 0 0	- 40.3	+17.2
2 1 20	269.8	4.0	4 13 20	208.6	11.5	7 1 20	26.9	17.3
2 2 40	266.4	4.8	4 14 40	217.3	10.8	7 2 40	- 13.4	17.4
2 4 0	262.3	5.6	4 16 0	225.5	10.1	7 4 0	+ 0.1	17.4
2 5 20	257.6	6.4	4 17 20	233.1	9.4	7 5 20	13.6	17.4
2 6 40	252.3	7.2	4 18 40	240.1	8.7	7 6 40	27.0	17.3
2 8 0	+246.4	- 8.0	4 20 0	-246.5	- 8.0	7 8 0	+ 40.4	+17.2
2 9 20	240.0	8.7	4 21 20	252.3	7.2			
2 10 40	+233.0	- 9.4	4 22 40	-257.6	- 6.4			

## COORDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE IV.

$t$	$x'$	$y'$	$t$	$x'$	$y'$	$t$	$x'$	$y'$
d h			d h			d h		
0 0	+ 0.0	+34.8	5 18	+406.2	-19.3	11 12	-449.0	-13.5
0 3	22.8	34.8	5 21	393.1	20.6	11 15	457.4	12.0
0 6	45.6	34.7	6 0	379.2	21.9	11 18	464.8	10.5
0 9	68.3	34.5	6 3	364.4	23.1	11 21	471.2	8.9
0 12	90.9	34.2	6 6	348.8	24.3	12 0	476.5	7.3
0 15	113.2	33.9	6 9	332.5	25.5	12 3	480.8	5.7
0 18	+135.3	+33.5	6 12	+315.4	-26.6	12 6	-484.0	- 4.1
0 21	157.1	33.0	6 15	297.6	27.6	12 9	486.2	2.5
1 0	178.5	32.4	6 18	279.2	28.5	12 12	487.3	- 0.8
1 3	199.6	31.8	6 21	260.2	29.4	12 15	487.3	+ 0.8
1 6	220.3	31.1	7 0	240.6	30.3	12 18	486.3	2.4
1 9	240.4	30.3	7 3	220.5	31.1	12 21	484.2	4.0
1 12	+260.0	+29.5	7 6	+199.9	-31.8	13 0	-480.9	+ 5.7
1 15	279.0	28.6	7 9	178.8	32.4	13 3	476.6	7.3
1 18	297.4	27.6	7 12	157.4	33.0	13 6	471.3	8.9
1 21	315.2	26.6	7 15	135.6	33.5	13 9	465.0	10.5
2 0	332.3	25.5	7 18	113.5	33.9	13 12	457.6	12.0
2 3	348.6	24.3	7 21	91.2	34.2	13 15	449.3	13.5
2 6	+364.1	+23.1	8 0	+ 68.7	-34.5	13 18	-440.0	+15.0
2 9	378.9	21.9	8 3	46.0	34.7	13 21	429.7	16.4
2 12	392.9	20.6	8 6	23.2	34.8	14 0	418.5	17.8
2 15	406.0	19.3	8 9	+ 0.3	34.8	14 3	406.3	19.2
2 18	418.2	17.9	8 12	- 22.5	34.8	14 6	393.2	20.6
2 21	429.5	16.5	8 15	45.3	34.7	14 9	379.3	21.9
3 0	+439.8	+15.0	8 18	- 68.0	-34.5	14 12	+364.6	+23.1
3 3	449.1	13.5	9 21	90.5	34.2	14 15	349.1	24.3
3 6	457.5	12.0	9 0	112.9	33.9	14 18	332.8	25.4
3 9	464.9	10.5	9 3	135.0	33.5	14 21	315.7	26.5
3 12	471.3	8.9	9 6	156.8	33.0	15 0	298.0	27.5
3 15	476.6	7.3	9 9	178.2	32.4	15 3	279.6	28.5
3 18	+480.8	+ 5.7	9 12	-199.3	-31.8	15 6	-260.5	+29.4
3 21	484.0	4.1	9 15	220.0	31.1	15 9	240.9	30.3
4 0	486.2	2.5	9 18	240.1	30.3	15 12	220.8	31.1
4 3	487.3	+ 0.8	9 21	259.7	29.5	15 15	200.2	31.8
4 6	487.3	- 0.8	10 0	278.7	28.6	15 18	179.2	32.4
4 9	486.3	2.4	10 3	297.2	27.6	15 21	157.7	33.0
4 12	+484.2	- 4.1	10 6	-315.0	-26.6	16 0	-135.9	+33.5
4 15	480.9	5.7	10 9	332.1	25.5	16 3	113.8	33.9
4 18	476.6	7.3	10 12	348.4	24.4	16 6	91.5	34.2
4 21	471.3	8.9	10 15	363.9	23.2	16 9	69.0	34.5
5 0	465.0	10.4	10 18	378.7	21.9	16 12	46.3	34.7
5 3	457.7	12.0	10 21	392.7	20.6	16 15	23.5	34.8
5 6	+440.3	-13.5	11 0	-405.8	-19.3	16 18	- 0.6	+34.8
5 9	439.9	15.0	11 3	418.0	17.9	16 21	+ 22.2	34.8
5 12	429.6	16.4	11 6	429.3	16.5	17 0	+ 45.0	+34.7
5 15	+418.4	-17.9	11 9	-439.6	-15.0			

# 472 JUPITER'S SATELLITES, 1879.

## SATELLITE I.

Date, 1879.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date, 1879.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.	
	Factor for $z'$ .	Factor for $y'$ .	$p$ .	$z$ .	$y$ .		Factor for $z'$ .	Factor for $y'$ .	$p$ .	$z$ .	$y$ .
Jan. 1	0.583	-0.060	-17 48.5	+25	-0	Aug. 3	1.271	+0.555	-24 30.8	-37	+3
8	0.876	-0.047	18 19.2	+23	-0	10	1.286	0.559	24 25.6	34	4
Mar. 7	0.875	+0.097	21 59.2	-23	+1	17	1.298	0.559	24 19.5	31	4
15	0.882	0.117	22 20.2	25	1	24	1.304	0.555	24 12.5	-27	4
22	0.890	0.137	22 39.4	26	1	31	1.305	0.547	24 5.0	+24	3
29	0.899	+0.158	-22 57.1	-28	+1	Sept. 8	1.302	+0.535	-23 57.2	+28	+3
Apr. 5	0.910	0.179	23 13.4	30	1	15	1.294	0.519	23 49.3	31	3
12	0.924	0.202	23 28.4	32	1	22	1.282	0.501	23 41.8	34	3
19	0.939	0.235	23 42.0	33	1	29	1.266	0.482	23 35.1	37	3
26	0.955	0.248	23 54.0	35	2	Oct. 6	1.246	0.462	23 29.5	39	3
May 3	0.973	+0.272	-24 4.1	-36	+2	13	1.223	+0.442	-23 24.9	+41	+3
10	0.992	0.296	24 12.6	38	2	20	1.199	0.422	23 21.6	42	3
17	1.013	0.320	24 19.7	39	2	27	1.174	0.404	23 20.3	43	2
24	1.035	0.345	24 26.0	41	2	Nov. 3	1.148	0.388	23 20.8	43	2
31	1.057	0.371	24 31.3	42	2	10	1.122	0.375	23 23.1	43	2
June 8	1.081	+0.397	-24 35.4	-43	+2	17	1.096	+0.364	-23 27.0	+43	+2
15	1.107	0.422	24 38.3	44	3	24	1.071	0.354	23 32.5	42	2
22	1.133	0.447	24 40.3	44	3	Dec. 1	1.047	0.348	23 39.1	41	2
29	1.159	0.470	24 41.3	44	3	8	1.024	0.344	23 46.8	39	2
July 6	1.184	+0.492	-24 41.2	-43	+3	16	1.003	+0.341	-23 55.5	+38	+2
13	1.209	0.512	24 40.1	42	3	23	0.983	0.341	24 4.8	36	2
20	1.232	0.530	24 38.0	41	3	30	0.965	+0.343	-24 14.3	+35	+2
27	1.253	+0.545	-24 34.9	-39	+3						

## SATELLITE II.

Date, 1879.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date, 1879.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.	
	Factor for $z'$ .	Factor for $y'$ .	$p$ .	$z$ .	$y$ .		Factor for $z'$ .	Factor for $y'$ .	$p$ .	$z$ .	$y$ .
Jan. 1	0.883	-0.002	-17 24.8	+32	0	July 30	1.261	+0.456	-24 6.4	-47	+5
8	0.876	+0.008	17 54.8	+29	0	Aug. 6	1.278	0.464	24 1.8	43	5
Mar. 9	0.877	0.108	21 38.5	-28	+1	13	1.291	0.468	23 56.3	39	6
17	0.884	0.123	21 58.9	30	1	20	1.300	0.469	23 49.8	33	6
24	0.893	0.138	22 17.9	33	2	27	1.305	0.466	23 42.5	-26	6
31	0.903	+0.154	-22 35.2	-36	+2	Sept. 3	1.305	+0.459	-23 34.6	+26	+5
Apr. 7	0.915	0.170	22 50.9	39	2	10	1.300	0.449	23 26.8	33	5
14	0.929	0.186	23 5.0	42	2	17	1.291	0.436	23 19.0	38	5
21	0.945	0.203	23 17.7	44	2	24	1.277	0.422	23 11.6	42	5
28	0.961	0.221	23 29.0	47	2	Oct. 1	1.259	0.406	23 5.1	46	5
May 5	0.979	+0.239	-23 39.0	-49	+3	9	1.237	+0.389	-22 59.8	+49	+5
13	0.999	0.258	23 47.5	51	3	16	1.214	0.372	22 55.8	52	4
20	1.020	0.277	23 54.6	53	3	23	1.190	0.356	22 53.6	54	4
27	1.042	0.297	24 0.6	54	3	30	1.164	0.341	22 53.0	55	4
June 3	1.065	+0.317	-24 5.5	-55	+4	Nov. 6	1.137	+0.327	-22 54.3	+56	+4
10	1.090	0.338	24 9.3	56	4	13	1.111	0.315	22 57.3	57	4
17	1.116	0.358	24 12.0	56	4	20	1.085	0.305	23 1.8	57	4
24	1.142	0.377	24 13.6	56	4	27	1.060	0.297	23 7.8	57	4
July 1	1.168	+0.396	-24 14.2	-56	+4	Dec. 4	1.037	+0.290	-23 15.0	+56	+4
8	1.193	0.414	24 13.8	55	4	12	1.015	0.285	23 23.3	54	4
15	1.217	0.430	24 12.4	53	5	19	0.995	0.281	23 32.3	51	3
23	1.240	+0.445	-24 9.9	-50	+5	26	0.975	+0.279	-23 41.8	+47	+3

SATELLITE III.

Date.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.			
	Factor for $x'$ .	Factor for $y'$ .	$P$ .	Dia.			Factor for $x'$ .	Factor for $y'$ .	$P$ .	Dia.		Resp.	
				$x$ .	$y$ .					$x$ .	$y$ .		
1878.						1879.							
Jan. 2	0.882	-0.103	-17 9.8	"	"	Aug. 6	1.277	+0.478	-24 35.1	48	+8	"	"
Mar. 8	0.875	+0.050	22 4.5	34	+	13	1.291	0.480	24 20.5	42	8	"	"
15	0.882	0.069	22 26.0	38	"	20	1.300	0.479	24 22.7	35	8	"	"
23	0.891	0.089	22 45.7	43	"	27	1.305	0.473	24 15.2	27	+8	"	"
30	0.902	0.110	23 3.7	49	"	Sept. 3	1.305	0.463	24 7.3	"	"	+28	+8
Apr. 6	0.914	+0.131	-23 20.2	54	+	10	1.290	+0.449	-23 59.2	"	"	+36	+8
13	0.927	0.152	23 35.2	59	"	17	1.290	0.433	23 51.2	"	"	43	7
20	0.942	0.174	23 48.5	63	"	25	1.276	0.415	23 43.7	"	"	49	7
27	0.959	0.197	24 0.2	67	"	Oct. 2	1.258	0.396	23 37.1	"	"	55	7
May 5	0.977	0.220	24 10.6	70	"	9	1.246	0.377	23 31.6	"	"	60	7
12	0.996	+0.244	-24 19.6	73	+	16	1.213	+0.358	-23 27.6	+32	+6	+65	+6
19	1.017	0.268	24 27.2	75	"	23	1.188	0.341	23 25.5	35	6	69	6
26	1.040	0.292	24 33.5	77	"	30	1.162	0.326	23 25.1	37	6	73	6
June 2	1.064	0.316	24 38.5	78	"	Nov. 7	1.135	0.314	23 26.5	39	6	76	6
9	1.089	0.340	24 42.4	78	"	14	1.109	0.309	23 29.7	40	6	78	6
17	1.114	+0.364	-24 45.2	77	+	21	1.083	+0.294	-23 34.4	+41	+6	+78	+6
24	1.140	0.387	24 46.9	75	"	28	1.058	0.288	23 40.6	41	6	77	6
July 1	1.166	0.408	24 47.6	72	"	Dec. 5	1.035	0.285	23 48.2	40	6	75	6
8	1.192	0.431	24 47.2	68	"	12	1.013	0.283	23 56.8	38	6	72	6
15	1.217	+0.445	-24 45.8	64	+	20	0.992	+0.283	-24 6.1	+35	+6	+68	+6
22	1.240	0.460	24 43.3	59	"	27	0.973	+0.285	-24 15.9	+32	+6	+63	+6
30	1.260	+0.471	-24 39.7	54	+								

SATELLITE IV.

Date.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.				Date.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.						
	Factor for $x'$ .	Factor for $y'$ .	$P$ .	Dia.		Resp.			Factor for $x'$ .	Factor for $y'$ .	$P$ .	Dia.		Resp.				
				$x$ .	$y$ .	$x$ .	$y$ .					$x$ .	$y$ .	$x$ .	$y$ .			
1879.								1879.										
Mar. 21	0.889	+0.069	-22 24.9	61	+	2	29	+	2	Aug. 19	1.299	+0.391	-24 7.2	49	+	13	"	"
Apr. 7	0.915	0.104	23 5.8	79	3	46	3			Sept. 4	1.305	0.377	23 49.2	"	"	+33	+13	
24	0.940	0.140	23 37.9	95	6	62	5			21	1.283	0.349	23 30.5	+33	+12	72	12	
May 11	0.903	0.188	24 4.7	109	6	75	6			Oct. 8	1.240	0.313	23 15.5	62	11	99	11	
27	1.044	0.234	24 18.2	120	8	84	8			24	1.184	0.279	23 8.2	81	10	115	10	
June 13	1.103	+0.281	-24 27.9	125	+10	88	+10			Nov. 10	1.122	+0.252	-23 10.7	+90	+9	120	+9	
30	1.163	0.325	24 31.5	124	11	83	11			27	1.063	0.235	23 22.4	87	8	117	8	
July 17	1.221	0.361	24 29.3	109	12	68	12			Dec. 14	1.009	0.228	23 41.3	81	8	109	8	
Aug. 2	1.270	+0.385	-24 21.1	84	+13	42	+13			31	0.962	+0.229	-24 5.7	+67	+8	+92	+8	

474 SATURN'S RING, &c., 1879.

THE APPARENT ELEMENTS OF SATURN'S RING.								
Washington Mean Noon.	<i>a</i>  Outer Major Axis.	<i>b</i>  Outer Minor Axis.	<i>p</i>  Inclination of Northern Semi-minor Axis to Circle of Declination from North to East.	<i>l</i>  The Elevation of the Earth above the Plane of the Ring.	<i>l'</i>  The Elevation of the Sun above the Plane of the Ring.	Earth's Longitude from Saturn counted on Plane of Ring from the Ring's As- cending Node on		
						Equator.	Ecliptic.	
Jan. 0	38.75	1.54	+ 4 20.5	— 2 16.6	— 4 55.0	51° 58.7	9° 9.9	
20	37.57	1.96	4 13.2	— 2 59.5	— 5 13.0	53 12.0	10 23.3	
Feb. 9	36.65	2.50	4 3.1	— 3 54.9	— 5 30.9	54 52.4	12 3.8	
March 1	36.06	3.13	3 50.8	— 4 59.0	— 5 48.9	56 52.1	14 3.6	
21	35.80	3.81	3 37.1	— 6 6.5	— 6 6.8	59 3.1	16 14.7	
April 10	35.89	4.51	3 22.8	— 7 13.2	— 6 24.7	61 17.5	18 29.3	
30	36.31	5.21	3 8.7	— 8 15.0	— 6 42.6	63 27.2	20 39.0	
May 20	37.05	5.88	2 55.8	— 9 8.4	— 7 0.5	65 24.5	22 36.3	
June 9	38.07	6.50	2 44.9	— 9 50.1	— 7 18.4	67 1.9	24 13.8	
29	39.34	7.03	2 37.0	— 10 17.5	— 7 36.2	68 12.2	25 24.2	
July 19	40.75	7.41	2 32.8	— 10 28.5	— 7 54.0	68 48.9	26 1.0	
Aug. 8	42.17	7.59	2 32.8	— 10 22.3	— 8 11.8	68 48.5	26 0.7	
28	43.40	7.54	2 37.0	— 9 59.9	— 8 29.5	68 11.7	25 24.0	
Sept. 17	44.24	7.24	2 44.5	— 9 25.0	— 8 47.2	67 4.9	24 17.3	
Oct. 7	44.50	6.76	2 53.7	— 8 44.1	— 9 4.8	65 42.0	22 54.4	
27	44.13	6.22	3 2.9	— 8 5.8	— 9 22.4	64 19.2	21 31.7	
Nov. 16	43.20	5.74	3 10.0	— 7 38.3	— 9 40.0	63 15.0	20 27.6	
Dec. 6	41.89	5.44	3 13.4	— 7 27.9	— 9 57.5	62 43.6	19 56.3	
26	40.45	5.36	3 12.7	— 7 36.8	— 10 15.0	62 49.8	20 2.6	
31	40.09	5.37	+ 3 11.8	— 7 42.0	— 10 19.4	62 57.5	20 10.3	
<p>Factors which are to be multiplied by <i>a</i> and <i>b</i> to obtain the axes of</p> <p>The inner ellipse of the outer Ring = 0.8801 log Factor = 9.9445</p> <p>The outer ellipse of the inner Ring = 0.8599 " = 9.9344</p> <p>The inner ellipse of the inner Ring = 0.6650 " = 9.8226</p> <p>The inner ellipse of Bond's dusky Ring = 0.5486 " = 9.7392</p> <p>NOTE.—The sign of <i>l</i> indicates whether the visible surface of the Ring is northern or southern.</p>								
THE APPARENT DISCS OF VENUS AND MARS.								
The Versed Sines of their Illuminated Portions, divided by their Apparent Diameters.								
1879.		Venus.	Mars.	1879.		Venus.	Mars.	
January	1	.994	.966	July	30	.403	.841	
	31	.974	.945	August	29	.169	.861	
March	2	.937	.922	September	28	.017	.913	
April	1	.881	.897	October	28	.252	.966	
May	1	.802	.874	November	27	.465	.987	
	31	.699	.854	December	27	.612	.932	
June	30	.570	.841					

WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

Jan.	d	h	m		April	d	h	m	
	1	18	28	☉ greatest Hel. Lat. N. °	15	2	32	♂ ☾ . . . . . ♂ - 3 25	
	2	4	-	☉ in Perigee.	16	6	29	♂ ☾ ☾ . . . . . ♀ - 4 8	
	2	8	37	♂ ☾ ☾ . . . . . ♀ - 7 26	16	17	31	♂ ☾ ☾ ☾ . . . . . ♀ - 7 32	
	5	0	-	♂ ☾ ☾ . . . . . ♀ - 4 31	19	5	36	♂ ☾ ☾ . . . . . ♀ - 6 57	
	9	8	-	♂ ☾ ☾ . . . . . ♀ - 2 43	20	10	46	♂ ☾ ☾ . . . . . ♀ - 2 43	
	9	10	25	☉ in Aphelion.	21	17	41	♂ ☾ ☾ . . . . . ♀ - 2 43	
	11	5	23	♂ ☾ ☾ . . . . . ♂ + 4 3	23	5	20	♂ ☾ ☾ . . . . . ♀ - 2 43	
	16	1	-	☉ greatest elong. W. 24 3	23	22	17	♂ ☾ ☾ . . . . . ♀ - 2 43	
	16	16	-	☾ stationary.	29	2	-	♂ ☾ ☾ . . . . . ♀ - 2 43	
	18	13	0	♂ ☾ ☾ . . . . . ♂ + 3 41	29	12	28	♂ ☾ ☾ . . . . . ♀ - 2 43	
	19	20	15	♂ ☾ ☾ . . . . . ♀ + 3 16	30	13	24	♂ ☾ ☾ . . . . . ♂ + 3 47	
	21	-	-	☉ eclipsed, invis. at Wash.	1	20	0	☉ in Perihelion.	
	22	19	36	♂ ☾ ☾ . . . . . ♀ - 2 36	3	9	52	☉ in Aphelion.	
	22	20	48	♂ ☾ ☾ . . . . . ♀ - 1 54	7	7	-	☉ stationary.	
	23	9	55	♂ ☾ ☾ . . . . . ♀ - 0 47	8	22	44	♂ ☾ ☾ . . . . . ♂ - 0 52	
	25	6	6	☉ in ☿	13	22	12	♂ ☾ ☾ . . . . . ♀ - 4 49	
	26	13	23	♂ ☾ ☾ . . . . . ♀ - 7 18	14	4	40	♂ ☾ ☾ . . . . . ♂ - 6 0	
	26	14	10	☐ ☾ ☾ . . . . . ♀ - 7 26	14	12	-	☉ greatest elong. W. 28 5	
	29	17	1	♂ ☾ ☾ . . . . . ♀ - 7 26	16	17	55	♂ ☾ ☾ . . . . . ♀ - 7 48	
Feb.	1	4	32	☉ greatest Hel. Lat. S.	18	11	51	♂ ☾ ☾ . . . . . ♀ - 8 47	
	4	10	37	☉ in Aphelion.	19	1	42	♂ ☾ ☾ . . . . . ♀ - 6 56	
	7	11	40	♂ ☾ ☾ . . . . . ♂ + 3 41	20	22	23	☐ ☾ ☾ . . . . . ♀ - 6 56	
	7	21	47	♂ ☾ ☾ . . . . . ♂ + 1 47	23	19	40	☉ greatest Hel. Lat. S.	
	16	6	24	♂ ☾ ☾ . . . . . ♂ + 1 28	23	23	8	☉ greatest Hel. Lat. N.	
	19	16	39	♂ ☾ ☾ . . . . . ♀ - 2 36	24	1	5	♂ ☾ ☾ . . . . . ♀ + 1 1	
	19	17	39	♂ ☾ ☾ . . . . . ♀ - 4 5	24	6	28	♂ ☾ ☾ . . . . . ♀ + 0 27	
	19	17	47	♂ ☾ ☾ . . . . . ♀ - 5 51	27	20	42	♂ ☾ ☾ . . . . . ♂ + 4 2	
	20	10	49	♂ ☾ ☾ . . . . . ♀ - 7 19	1	12	45	☐ ☾ ☾ . . . . . ♀ - 5 23	
	22	8	1	♂ ☾ ☾ . . . . . ♂ - 7 45	10	11	34	♂ ☾ ☾ . . . . . ♀ - 8 6	
	23	3	5	♂ ☾ ☾ . . . . . ♂ - 1 1	11	19	31	☉ in ☿	
	24	20	26	☉ greatest Hel. Lat. S.	12	6	39	♂ ☾ ☾ . . . . . ♂ - 7 45	
	26	1	33	♂ ☾ ☾ . . . . . ♀ - 7 18	13	5	31	♂ ☾ ☾ . . . . . ♂ - 8 6	
Mar.	2	16	9	♂ ☾ ☾ . . . . . ♀ - 1 11	15	1	20	☉ greatest Hel. Lat. S.	
	3	14	32	♂ ☾ ☾ . . . . . ♂ + 3 35	15	10	6	♂ ☾ ☾ . . . . . ♀ - 7 1	
	6	19	57	♂ ☾ ☾ . . . . . ♂ + 3 35	16	9	30	☉ in Perihelion.	
	14	19	15	♂ ☾ ☾ . . . . . ♀ - 2 8	18	6	47	♂ ☾ ☾ . . . . . ♀ - 1 4	
	15	20	15	☉ in ☿	19	5	42	☉ enters ♊, summer com.	
	17	2	43	♂ ☾ ☾ . . . . . ♂ - 0 38	21	2	35	♂ ☾ ☾ . . . . . ♀ + 4 1	
	19	12	56	♂ ☾ ☾ . . . . . ♀ - 3 19	22	23	40	♂ ☾ ☾ . . . . . ♂ + 4 14	
	20	6	26	☉ enters ♈, spring com.	24	3	47	♂ ☾ ☾ . . . . . ♂ + 4 14	
	20	10	14	☉ in Perihelion.	26	16	57	☉ greatest Hel. Lat. N.	
	22	17	38	♂ ☾ ☾ . . . . . ♀ - 7 22	30	2	18	♂ ☾ ☾ . . . . . ♂ + 0 1	
	23	21	30	♂ ☾ ☾ . . . . . ♀ - 3 37	1	15	-	☉ stationary.	
	24	17	27	♂ ☾ ☾ . . . . . ♀ - 5 36	2	3	-	☉ in Apogee.	
	25	9	45	♂ ☾ ☾ . . . . . ♀ - 7 6	7	7	5	☐ ☾ ☾ . . . . . ♀ - 5 42	
	26	1	18	♂ ☾ ☾ . . . . . ♂ - 0 15	7	21	32	♂ ☾ ☾ . . . . . ♂ - 0 15	
	29	1	-	☉ greatest elong. E. 18 57	8	3	2	♂ ☾ ☾ . . . . . ♂ - 0 15	
	29	11	6	☉ in ☿	9	1	58	☉ in Perihelion.	
	30	17	42	☉ greatest Hel. Lat. N.	10	15	59	♂ ☾ ☾ . . . . . ♀ - 8 20	
	31	18	1	♂ ☾ ☾ . . . . . ♀ - 1 56	11	5	47	♂ ☾ ☾ . . . . . ♀ - 8 20	
April	3	5	0	♂ ☾ ☾ . . . . . ♂ + 3 36	12	18	48	♂ ☾ ☾ . . . . . ♀ - 7 5	
	6	11	-	☉ stationary.	15	13	-	☉ greatest elong. E. 45 33	

## WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

July						Oct.					
18	<sup>a</sup>	<sup>b</sup> <sup>m</sup>	☉ eclipsed, invis. at Wash.			5	<sup>a</sup> <sup>b</sup> <sup>m</sup>	6	♂ ☉ Sup.		
19	0	35	♀ in ☿			6	1	11	♂ ☉ stationary.		
20	4	35	♀ in ☿			11	23	55	♂ ☉ ☾ . . . . .	♂ + 4 51	
20	21	27	♂ ☉ ☾ . . . . .	♂ + 2 45		12	22	6	♂ ☉ ☾ . . . . .	♀ - 0 51	
21	11	36	♂ ☉ ☾ . . . . .	♂ + 4 20		14	14	-	♀ stationary.		
21	16	39	☐ ♂ ☉			15	13	2	♂ ☉ ☾ . . . . .	♂ + 5 19	
22	10	35	♂ ☉ ☾ . . . . .	♀ + 4 8		16	3	50	♂ ☉ in ☿		
26	17	-	♂ greatest elong. E. 27 10			24	8	13	♂ ♃ ☾ . . . . .	♂ - 5 17	
27	17	-	♂ stationary.			26	8	24	♂ in Aphelion.		
29	20	10	♂ ☉ ♀ . . . . .	♂ + 3 43		27	12	23	♂ ♃ ☾ . . . . .	♂ - 8 23	
30	9	8	♂ in Aphelion.			28	13	-	♂ stationary.		
Aug. 4	3	15	♂ ♃ ☾ . . . . .	♂ - 5 41		29	20	36	♂ ♃ ☾ . . . . .	♂ - 6 47	
4	3	45	☐ ♃ ☉			30	-	-	♀ at greatest brilliancy.		
7	0	32	♂ ♃ ☾ . . . . .	♂ - 8 26		30	23	52	♂ ☉ ☾ . . . . .	♂ - 4 39	
8	23	33	♂ ☉ ☾ . . . . .	♂ - 7 55		Nov. 2	17	12	♂ ☉ ☾ . . . . .		
9	3	18	♂ ♃ ☾ . . . . .	♂ - 7 4		8	11	49	♂ ☉ ☾ . . . . .	♂ + 5 11	
9	20	-	♂ stationary.			9	4	15	♂ in ☿		
13	15	31	♂ ♃ ☉ . . . . .	♂ - 0 15		9	11	-	♂ in ☿		
14	22	-	♂ stationary.			10	7	52	♂ ☉ ☾ . . . . .	♀ + 5 36	
17	20	56	♂ ☉ ☾ . . . . .	♂ - 1 27		12	2	56	♂ ☉ ☾ . . . . .		
17	22	21	♂ ☉ ☾ . . . . .	♂ + 4 27		14	19	7	♂ ☉ ☾ . . . . .	♂ + 0 13	
19	-	-	♀ at greatest brilliancy.			15	18	10	♂ greatest Hel. Lat. S.		
19	18	54	♂ greatest Hel. Lat. S.			20	11	-	♂ greatest elong. E. 22 5		
20	1	14	♂ ☉ ☾ . . . . .	♀ + 0 27		20	16	1	♂ ♃ ☾ . . . . .	♂ - 5 30	
22	4	42	♀ in Aphelion.			23	15	32	♂ ♃ ☾ . . . . .	♂ - 8 26	
23	10	18	♂ ☉ ☾ Inf.			26	2	40	☐ ♃ ☉		
27	14	48	♂ ☉ ☾			26	2	55	♂ ♃ ☾ . . . . .	♂ - 6 49	
30	20	15	♂ ☉ ☾			26	11	56	♂ ☉ ☾ . . . . .	♂ - 3 47	
31	5	9	♂ ♃ ☾ . . . . .	♂ - 5 28		29	18	-	♂ stationary.		
Sept. 2	5	-	♀ stationary.			30	17	59	☐ ☉ ☾		
2	14	-	♀ stationary.			Dec. 3	15	-	♀ greatest elong. W. 46 49		
3	6	32	♂ ♃ ☾ . . . . .	♂ - 8 26		4	18	3	♂ in ☿		
5	10	53	♂ ♃ ☾ . . . . .	♂ - 6 56		5	20	35	♂ ☉ ☾ . . . . .	♂ + 5 28	
6	8	30	♂ ☉ ☾ . . . . .	♂ - 6 55		9	8	2	♂ in Perihelion.		
7	18	47	♂ in ☿			9	15	5	♂ ☉ ☾ . . . . .	♀ + 8 1	
8	-	-	♂ greatest Hel. Lat. S.			9	18	21	♂ ☉ ☾ Inf.		
8	22	-	♂ greatest elong. W. 17 58			11	16	-	♂ stationary.		
12	8	46	♂ in Perihelion.			12	8	29	♂ ☉ ☾ . . . . .	♂ + 5 6	
13	21	13	♂ greatest Hel. Lat. S.			12	18	0	♀ in Perihelion.		
14	9	39	♂ ☉ ☾ . . . . .	♂ - 0 39		14	1	-	♂ stationary.		
14	10	44	♂ ☉ ☾ . . . . .	♂ + 4 36		15	19	-	♂ stationary.		
14	10	52	♂ ☉ ☾ . . . . .	♂ + 5 14		18	5	56	♂ ♃ ☾ . . . . .	♂ - 5 49	
16	5	24	♂ ☉ ☾ . . . . .	♀ - 4 7		19	15	29	♂ greatest Hel. Lat. N.		
22	16	14	♂ greatest Hel. Lat. N.			19	18	-	♂ stationary.		
22	17	9	☉ enters ♏, autumn com.			20	22	39	♂ ♃ ☾ . . . . .	♂ - 8 28	
23	8	10	♂ ☉ ☾ Inf.			21	11	18	☉ enters ♏, winter com.		
25	12	48	♂ ☉ ☾ . . . . .	♂ + 11 11		23	8	18	♂ ☉ ☾ . . . . .	♂ - 6 55	
27	5	37	♂ ♃ ☾ . . . . .	♂ - 5 16		23	13	50	♂ ☉ ☾ . . . . .	♂ - 3 8	
30	10	5	♂ ♃ ☾ . . . . .	♂ - 8 25		28	-	-	☾ eclipsed, invis. at Wash.		
Oct. 2	17	7	♂ ♃ ☾ . . . . .	♂ - 6 48		28	1	-	♂ greatest elong. W. 22 35		
4	2	29	♂ ☉ ☾ . . . . .	♂ - 5 45		30	13	53	☐ ♃ ☉		
5	6	15	♂ ☉ ☾			31	9	-	☉ in Perigee.		

## POSITIONS OF THE PRINCIPAL OBSERVATORIES.

*(North Latitudes and West Longitudes are considered as positive.)*

Place.	Latitude.	Longitude from Washington in Time.	Longitude from Washington in Days.	Longitude from Washington in Arc.
*Åbo, . . . . .	+60° 26' 56.8	— 6 <sup>h</sup> 37 <sup>m</sup> 20.32 <sup>s</sup>	— .2759296	260° 39' 55.2
Albany, . . . . .	+42 39 49.5	— 0 13 12.87	— .0091767	356 41 47.0
Allegheny, . . . . .	+40 27 36.0	+ 0 11 50.66	+ .0082252	2 57 39.9
Altona, . . . . .	+53 32 45.3	— 5 47 58.54	— .2416498	273 0 21.9
Ann Arbor, . . . . .	+42 16 48.0	+ 0 26 42.67	+ .0185494	6 40 40.0
Armagh, . . . . .	+54 21 12.7	— 4 41 36.92	— .1955662	289 35 46.2
Athens, . . . . .	+37 58 20.0	— 6 43 7.58	— .2799488	259 13 6.3
Berlin, . . . . .	+52 30 16.7	— 6 1 47.77	— .2512473	269 33 3.4
Bilk, . . . . .	+51 12 25.0	— 5 35 17.77	— .2328445	276 10 33.4
*Bonn, . . . . .	+50 43 45.0	— 5 36 36.02	— .2337502	275 50 59.7
Breslau, . . . . .	+51 6 56.5	— 6 16 22.19	— .2613679	265 54 27.1
Brussels, . . . . .	+50 51 10.7	— 5 25 41.29	— .2261723	278 34 40.7
Cambridge, (Eng.), . . . . .	+52 12 51.8	— 5 8 35.08	— .2142949	282 51 13.8
Cambridge, (Mass.), . . . . .	+42 22 48.1	— 0 23 41.54	— .0164530	354 4 36.9
Cape of Good Hope, . . . . .	—33 56 3.2	— 6 22 8.09	— .2653711	264 27 58.7
Chicago, . . . . .	+41 50 1.0	+ 0 42 14.26	+ .0293317	10 33 33.9
Cincinnati, . . . . .	+39 6 26.5	+ 0 29 46.94	+ .0206822	7 26 44.1
Christiania, . . . . .	+59 54 43.7	— 5 51 6.69	— .2438274	272 13 19.6
Clinton, . . . . .	+43 3 16.5	— 0 6 35.08	— .0045727	358 21 13.8
Copenhagen, . . . . .	+55 41 13.6	— 5 58 31.05	— .2489703	270 22 14.3
Cordoba . . . . .	—31 25 15.4	— 0 51 27.00	— .0357639	347 7 30.0
*Cracow, . . . . .	+50 3 50.0	— 6 28 2.80	— .2694768	262 59 18.0
*Dorpat, . . . . .	+58 22 47.0	— 6 55 6.02	— .2882641	256 13 29.7
Dublin, . . . . .	+53 23 13.0	— 4 42 50.39	— .1964165	289 17 24.1
Durham, . . . . .	+54 46 6.4	— 5 1 52.64	— .2096370	284 31 50.4
Edinburgh, . . . . .	+55 57 23.2	— 4 55 29.34	— .2052007	286 7 39.9
*Florence, . . . . .	+43 46 40.8	— 5 53 15.12	— .2453139	271 41 13.2
*Geneva, . . . . .	+46 11 58.8	— 5 32 49.24	— .2311344	276 47 41.4
Georgetown, . . . . .	+38 54 26.2	+ 0 0 6.20	+ .0000718	0 1 33.0
*Göttingen, . . . . .	+51 31 47.8	— 5 47 58.49	— .2416492	273 0 22.7
Gotha, . . . . .	+50 56 37.5	— 5 51 3.39	— .2437892	272 14 9.2
Greenwich, . . . . .	+51 28 38.2	— 5 8 12.39	— .2140323	282 56 54.2
Hamburg, . . . . .	+53 33 7.0	— 5 48 5.95	— .2417355	272 58 30.8
*Helsingfors . . . . .	+60 9 42.6	— 6 48 1.32	— .2833486	257 59 40.2
Hudson, . . . . .	+41 14 42.6	+ 0 17 32.06	+ .0121766	4 23 0.9
Kasan, . . . . .	+55 47 24.2	— 8 24 41.14	— .3504761	233 49 42.9
Königsberg, . . . . .	+54 42 50.6	— 6 30 11.87	— .2709707	262 27 2.0
*Kremsmünster, . . . . .	+48 3 23.7	— 6 4 45.03	— .2532990	268 48 44.6
Leipsic, . . . . .	+51 20 6.3	— 5 57 46.87	— .2484592	270 33 17.0
Leyden, . . . . .	+52 9 20.3	— 5 26 8.57	— .2264881	278 27 51.5
Liverpool, . . . . .	+53 24 47.7	— 4 56 12.34	— .2056984	285 56 54.9
Madras, . . . . .	+13 4 9.2	—10 29 9.67	— .4369175	202 42 35.0
Madrid, . . . . .	+40 24 29.7	— 4 53 27.00	— .2037847	286 38 15.0
*Mannheim, . . . . .	+49 29 12.9	— 5 42 3.06	— .2375354	274 29 14.1



Place.	Latitude.	Longitude from Washington in Time.	Longitude from Washington in Days.	Longitude from Washington in Arc.
Markree, . . . .	+54° 10' 31".8	— 4 <sup>h</sup> 34 <sup>m</sup> 24.00 <sup>s</sup>	— .1905556	291° 24' 0.0
*Marseilles, . . . .	+43 17 49.0	— 5 29 40.55	— .2289415	277 34 51.8
*Milan, . . . . .	+45 28 0.7	— 5 44 58.20	— .2395625	273 45 27.0
*Modena, . . . . .	+44 38 52.8	— 5 51 55.53	— .2443927	272 1 7.1
Moscow, . . . . .	+55 45 19.8	— 7 38 29.29	— .3183946	245 22 40.7
*Munich, . . . . .	+48 8 45.0	— 5 54 38.00	— .2462731	271 20 30.0
*Naples, . . . . .	+40 51 46.6	— 6 5 10.95	— .2535990	268 42 15.8
New York, . . . . .	+40 43 48.5	— 0 12 15.47	— .0085124	356 56 0.8
Nicolajew, . . . . .	+46 58 20.6	— 7 16 6.53	— .3028534	250 58 22.1
*Olmütz, . . . . .	+49 35 43.0	— 6 17 15.43	— .2619841	265 41 8.6
Oxford, . . . . .	+51 45 35.5	— 5 3 9.79	— .2105300	284 12 33.2
*Padua, . . . . .	+45 24 2.5	— 5 55 41.17	— .2470043	271 4 42.5
*Palermo, . . . . .	+38 6 44.0	— 6 1 37.00	— .2511227	269 35 45.0
Paramatta, . . . . .	—33 48 49.8	—15 12 18.64	— .6335491	131 55 20.4
*Paris, . . . . .	+48 50 11.0	— 5 17 33.02	— .2205211	280 36 44.7
Philadelphia, . . . .	+39 57 7.5	— 0 7 33.64	— .0052505	358 6 35.4
*Prague, . . . . .	+50 5 18.5	— 6 5 53.52	— .2540917	268 31 37.2
Pulkowa, . . . . .	+59 46 18.1	— 7 9 31.06	— .2982757	252 37 14.1
Rome, . . . . .	+41 53 53.7	— 5 58 8.53	— .2487098	270 27 52.1
*San Fernando, . . . .	+36 27 45.0	— 4 43 22.42	— .1967873	289 9 23.7
Santiago, . . . . .	—33 26 42.0	— 0 25 30.00	— .0177083	353 37 30.0
Senftenberg, . . . . .	+50 5 10.1	— 6 14 3.00	— .2597570	266 29 15.0
*Speyer, . . . . .	+49 18 55.4	— 5 41 58.00	— .2374769	274 30 30.0
*Stockholm, . . . . .	+59 20 33.8	— 6 20 26.35	— .2641939	264 53 24.7
St. Petersburg, . . . .	+59 56 29.7	— 7 9 25.87	— .2982161	252 38 32.0
*Upsala, . . . . .	+59 51 31.5	— 6 18 42.70	— .2629942	265 19 19.5
*Utrecht, . . . . .	+50 5 10.5	— 5 28 43.67	— .2282832	277 49 5.0
*Vienna, . . . . .	+48 12 35.5	— 6 13 44.09	— .2595381	266 33 58.7
Washington, . . . . .	+38 53 38.8	0 0 0.00	.0000000	0 0 0.0
*Wilna, . . . . .	+54 50 59.1	— 6 49 23.33	— .2842978	257 39 10.1

The authorities for these positions are given in the volumes for 1871 and 1872.

More recent telegraphic determinations, made by the *United States Coast Survey*\*, give the longitude of Cambridge, Mass., —0<sup>h</sup> 23<sup>m</sup> 41<sup>s</sup>.11, that of Greenwich, —5<sup>h</sup> 8<sup>m</sup> 12<sup>s</sup>.09, and that of Paris, —5<sup>h</sup> 17<sup>m</sup> 33<sup>s</sup>.15.

The correction therefore to be applied to the longitudes of Ann Arbor, Cambridge, (Mass.), Chicago, and Clinton, in the preceding table, is +0°.43 = +0<sup>d</sup>.0000050 = +6<sup>''</sup>.45; to the longitudes of places marked with an \*, —0°.13 = —0<sup>d</sup>.0000015 = —1<sup>''</sup>.95; and to the longitudes of other places not in the United States, +0°.30 = +0<sup>d</sup>.0000035 = +4<sup>''</sup>.50.

# ON THE ARRANGEMENT AND USE OF THE TABLES IN THIS EPHEMERIS.

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## THE NAUTICAL PART.

THIS Part of the AMERICAN EPHEMERIS AND NAUTICAL ALMANAC is designed for the special use of NAVIGATORS and therefore adapted to the Meridian of Greenwich. It contains the Ephemeris of the sun and moon; the distances of the moon from the centres of the sun and the four most conspicuous planets, and from certain fixed stars; the Ephemeris of the planets Venus, Mars, Jupiter, and Saturn; and the Mean Places of 196 principal fixed stars for the beginning of the year 1879.

*Time.*—Astronomers make use of several different kinds of time; an explanation of the nature of which, and of the method of passing from one to another, properly precedes an explanation of the uses of the Ephemeris.

*Sidereal Time.*—Sidereal time is measured by the daily motion of the stars, or, as it is used by astronomers, by the daily motion of that point in the equator from which the true right ascensions of the stars are counted. This point is the vernal equinox, and its hour angle is called the *Sidereal Time*. Astronomical clocks are regulated to sidereal time.

A *Sidereal Day* is the interval of time between the transit of the vernal equinox over any meridian, and its next succeeding return to the same meridian. It is divided into 24 hours. The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the true vernal equinox over the upper meridian, and ending with its return to the same meridian.

The vernal equinox is not a fixed, but a movable, point on the equator. Its motion is composed of two parts: precession, which is proportional to the time and is combined with the daily motion of the heavens; and nutation, which is periodical. In consequence of the latter, the daily motion of the equinox is not strictly a uniform measure of time, and the sidereal time in common use might therefore be called *Apparent Sidereal Time*; and *Mean Sidereal Time* would be that reckoned from the transit of the mean equinox; but the irregularity referred to cannot exceed 2".3 in a period of nineteen years, and is, therefore, of no practical importance.

*Solar Time.*—Solar time is measured by the daily motion of the sun. A *Solar Day* is the interval of time between two successive transits of the sun over the same meridian; and the hour angle of the sun is called *Solar Time*. This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the meridian are not exactly equal, but depend upon the variable motion of the sun in right ascension.

The want of uniformity in the sun's motion in right ascension arises from two different causes; one, that the sun does not move in the equator, but in the ecliptic; the other, that the sun's motion in the ecliptic is not uniform.

To avoid the irregularity in time caused by the want of uniformity in the sun's motion, a fictitious sun, called a *Mean Sun*, is supposed to move in the equator with a uniform velocity.

*Mean Time*, which is perfectly equable in its increase, is measured by the motions of this *Mean Sun*; the latter at certain periods agrees with the real sun, then again is in advance of it, and at other times is behind it. The clocks in ordinary use, and chronometers used by Navigators, are regulated to *mean* time.

*True or Apparent Time* is measured by the motion of the real sun.

The difference between the *apparent* and *mean* time is called the *Equation of Time*. By means of it we change *apparent* to *mean* time, or the reverse. Thus, if the *apparent* time be given, the *mean* time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found, on page I. of the Calendar. If the *mean* time be given, the *apparent* time is obtained by applying the equation of time as directed by the precept on page II. of the Calendar.

*Day*.—The *civil day*, according to the customs of society, commences at midnight, and comprises twenty-four hours from one midnight to the next following. The hours are counted from 0 to 12 from midnight to noon, after which they are again reckoned from 0 to 12 from noon to midnight. Thus the day is divided into two periods of 12 hours each; the first of which is marked A. M., the last is marked P. M.

The *astronomical day* commences at noon of the civil day of the same date. It also comprises twenty-four hours, but they are reckoned from 0 to 24, and from the noon of one day to that of the next following. The astronomical, as well as the civil, time may be either *apparent* or *mean*, according as it is reckoned from *apparent* noon, or from *mean* noon.

The civil day begins twelve hours before the astronomical day; therefore the first part of the *civil day* answers to the last part of the preceding *astronomical day*, and the last part of the *civil day* to the first part of the same *astronomical day*. Thus, January 9th, 2<sup>h</sup> A. M., *civil time*, is January 8th, 14<sup>h</sup>, *astronomical time*; and January 9th, 2<sup>h</sup> P. M., *civil time*, is also January 9th, 2<sup>h</sup>, *astronomical time*. The rule, then, for the transformation of civil time into astronomical time is this: If the civil time is marked A. M., take one from the day, and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.

If the longitude from Greenwich be expressed in time, and, when *west*, added to the local time, or, when *east*, subtracted from the local time, the result is the corresponding Greenwich time. If the local astronomical time is used, the result is the *Greenwich astronomical time*, which ordinarily is that required for the use of this Part of the Ephemeris.

**THE CALENDAR.**—The Calendar is divided into twelve months, and to each month are assigned eighteen pages, of which the contents are as follows:

Page I. contains the *Apparent Right Ascension and Declination* of the Sun and the *Equation of Time* for each Greenwich *apparent* noon. Adjoining columns contain the differences of these quantities for one hour. By multiplying this difference by the hours and parts of an hour from Greenwich *apparent* noon, and adding the amount to, or subtracting it from, the quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of the quantity for a given *Greenwich apparent time*. The hourly differences are given for the instant of *apparent* noon at Greenwich, and, when great accuracy is required, should be first interpolated for *half* the hours and parts of an hour of the Greenwich *apparent* time.

This page is chiefly used when the sun is observed on the meridian, and the local *apparent* time is 0. The longitude from Greenwich expressed in time, if *west*, is at that instant the Greenwich *apparent* time, or time *after* Greenwich *apparent* noon; if *east*, it is time *before* Greenwich *apparent* noon. The longitude is therefore employed in reducing the quantities on this page to *apparent* noon at any place.

The Right Ascension of the sun thus reduced is the *Sidereal Time of local apparent noon*. The difference between it and the clock time of the meridian passage of the sun is the error of the clock on *sidereal* time.

The Declination of the sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the sun.

As an example of the use of this page, let the sun's declination be required at noon of January 3d, 1879, in longitude  $146^{\circ} 4' W.$ , or  $+9^h 44^m 16^s$ . We find

For January 3d, at Greenwich *apparent* noon,  $\odot$ 's declination  $= 22^{\circ} 50' 22.8'' S.$

The diff. for 1 hour, $+14''.63$ , multiplied by 9, is	131.67
The proportional part for $30^m = \frac{3}{4}^h$ ,	7.32
" " " $12^m = \frac{1}{2}^h$ ,	2.93
" " " $2^m = \frac{1}{30}^h$ ,	.49
" " " $15^s = \frac{1}{4}$ of $2^m$ ,	.06

The sum to be subtracted, 142.47 or 2 22.5 N.

The sun's declination required, 22 48 0.3 S.

The longitude  $9^h 44^m 16^s = 9^h 44^m 27^s = 9^h 738^s$ ; and  $14''.63 \times 9.738 = 142''.47 = 2' 22''.47$ ; which is also the reduction obtained in another way.

If the longitude is  $146^{\circ} 4' E.$ , the reduction,  $2' 22''.5$ , should be added, and the resulting declination becomes  $22^{\circ} 52' 45''.3 S.$

If greater precision is required, the hourly difference may be first interpolated for  $4^h 52^m$  (or half the longitude) *after* noon for the *west* longitude, or for  $4^h 52^m$  *before* noon for the *east* longitude. This will give, in the first case, the hourly difference  $14''.86$ , and the resulting declination  $22^{\circ} 47' 58''.1 S.$ ; and, in the second case, the hourly difference  $14''.40$ , and the declination  $22^{\circ} 52' 43''.0 S.$

At sea, however, it is ordinarily sufficient to have the declination to the nearest half minute; and the reduction may be found by Table V. of BOWDITCH'S *American Practical Navigator*.

The *Equation of Time*, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the *apparent* time, or the time given by an observation of the sun, to obtain the *mean* time. The heading of the column directs the manner in which the equation is to be applied. Where there is a change in the course of the month from addition to subtraction, or the reverse, as in the months of April and June, the two different directions are separated by a line, while a corresponding line below points out the date at which the change takes place. The equation of time, as given on page I., is the *mean* time of *apparent* noon, or the hour angle of the mean sun at that instant.

On page I. are also given the *Sun's Semidiameter*, which is used in reducing the altitude of a limb of the sun, or the angular distance of the limb from the moon or some other object, to the altitude, or distance, of the centre of the sun; and the *Sidereal Time of the Semidiameter passing the Meridian*, which is employed in obtaining the passage of the sun's centre over the wires of a transit-instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the *first*, or western, limb, to be subtracted from the time of transit of the *second*, or eastern, limb.

Page II. contains for each Greenwich *mean* noon the *Apparent Right Ascension* and *Declination of the Sun*, the *Equation of Time*, and the *Sidereal Time of Mean Noon*. The hourly changes of these quantities are also given for noon, and may be used in reducing them to any given Greenwich *mean* time. The hourly changes may be first interpolated for *half* the Greenwich time, when great precision is required.

The Right Ascension and Declination on pages I. and II. are affected by *Aberration*, and therefore denote the *apparent* position of the *true* sun. Page II. is more conveniently used when the *mean* time is known. This is the case in most observations of the sun out of the meridian, when the times have been noted by a clock or chronometer regulated to *mean* time. The quantities on this page can be reduced to mean noon of any place by interpolating for the longitude, as in the example of the sun's declination, on the preceding page.

The sun's declination is required for finding the latitude of the place the local time, and the sun's azimuth and amplitude, from observations of the sun.

The equation of time is needed in finding the mean time from observations of the sun, and the latitude from other than meridian observations. The heading of the column directs the manner in which it is to be applied to *mean* time to obtain the *apparent* time.

As given on page II., the equation of time is the apparent time of mean noon; and in general it is the hour angle of the *true* sun at the instant of *mean* noon.

The *Sidereal Time of Mean Noon* is also the *Right Ascension of the Mean Sun*. It may be reduced for the longitude, or to any Greenwich *mean* time, by using the hourly difference,  $9^{\circ}.8565$ ; or by Table III., in the Appendix of the *American Ephemeris*, for *reducing intervals of mean solar to sidereal time*. Table LI. of Bowditch's *Navigator* may be used for the same purpose when the nearest quarter of a second only is required.

The sun's right ascension and the sidereal time of mean noon, or right ascension of the mean sun, are useful in converting solar time to sidereal time. If we add the right ascension of the *true* sun to the *apparent* time, or the right ascension of the *mean* sun to the *mean* time, the result will be the *sidereal* time.

The sidereal time of mean noon reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time, gives the interval of sidereal time from noon. Subtracting from this the corresponding reduction of a *sidereal interval to a mean time interval*, in Table II. of the *American Ephemeris* or Table LII. of Bowditch's *Navigator*, will give the mean time required. This reduction may also be found by multiplying  $9^{\circ}.8296$  by the hours and parts of an hour of the given *sidereal* time.

As examples of the use of page II.:

1. Let the sun's right ascension and the equation of time be required for 1879, Jan. 4, 6<sup>h</sup> 12<sup>m</sup> 13<sup>s</sup> A. M. mean time at a place whose longitude is  $118^{\circ} 14'$  E.

The local astronomical mean time is	Jan. 3, 18 <sup>h</sup> 12 <sup>m</sup> 13 <sup>s</sup>
The longitude in time,	— 7 52 56
The Greenwich mean time,	Jan 3, 10 19 17
	or Jan. 3, 10.3214
<hr/>	
Sun's R. A.	
Jan. 3, Noon,	18 <sup>h</sup> 55 <sup>m</sup> 37.98 <sup>s</sup>
H. D. $11^{\circ}.008 \times 10.3214$	+ 1 53.62
	18 57 31.60
<hr/>	
Equation of time.	
Jan. 3, Noon,	4 41.22 Subtractive.
H. D. $+1^{\circ}.151 \times 10.3214$	+ 11.88
	4 53.10
<hr/>	

If greater precision is required, the hourly differences interpolated to  $5^{\text{h}}.2$ , or  $11^{\circ}.004$  for the right ascension, and  $1^{\circ}.147$  for the equation of time, should be used.

The equation of time in this example is *subtractive* from mean time. Its reduction could have been found by Table VI. A. of Bowditch's *Navigator* to seconds only.

2. If the sidereal time is required for the same date and time, we have

Jan 3, Noon, the R. A. of the mean sun	18 <sup>h</sup> 50 <sup>m</sup> 56.76 <sup>s</sup>
Add the H. D. $9^{\circ}.8565 \times 10.3214$ , or	+ 1 41.73
Add the local astronomical mean time	18 12 13.00
The required sidereal time is, (rejecting $24^{\text{h}}$ .)	13 4 51.49
<hr/>	

The reduction  $1^{\text{m}} 41^{\text{s}}.73$  could have been found in Table III. corresponding to the Greenwich mean time,  $10^{\text{h}} 19^{\text{m}} 17^{\text{s}}$ . By Table LI. of Bowditch's *Navigator*, the reduction is  $1^{\text{m}} 41^{\text{s}}.7$ .

3. 1879, Jan. 4, A. M., at a place whose longitude is  $116^{\circ} 14'$  E., suppose the sidereal time to be  $13^{\text{h}} 4^{\text{m}} 51^{\text{s}}.49$ , and that the corresponding mean time is required.

The astronomical day is Jan. 3; the longitude in time —  $7^{\text{h}} 52^{\text{m}} 56^{\text{s}}$ , or —  $7^{\text{h}}.882$ .

Jan. 3, the sidereal time of Greenwich mean noon is	$18^{\text{h}} 50^{\text{m}} 56^{\text{s}}.76$
The H. D. $9^{\text{s}}.8565 \times (-7.882)$ , or the red. for $7^{\text{h}} 52^{\text{m}} 56^{\text{s}}$ in Table III.	— $1^{\text{m}} 17.69$
The sidereal time of local noon,	$18^{\text{h}} 49^{\text{m}} 39.07$
The given sidereal time (+ $24^{\text{h}}$ , if necessary for the following subtraction)	$37^{\text{h}} 4^{\text{m}} 51.49$
Subtracting the first from the second gives the <i>sidereal interval</i> from noon	$18^{\text{h}} 15^{\text{m}} 12.42 = 18^{\text{h}}.254$
— $9^{\text{s}}.8296 \times 18.254$ , or the red. for $18^{\text{h}} 15^{\text{m}} 12^{\text{s}}$ in Table II.,	— $2^{\text{m}} 59.42$
The required astronomical mean time is,	Jan. 3, $18^{\text{h}} 12^{\text{m}} 13.00$

Page III. contains the *Longitude and Latitude of the Sun*, and the *Logarithm of its Distance from the Earth*, at Greenwich mean noon of each day. The longitude is given in two columns, headed  $\lambda$  and  $\lambda'$ ;  $\lambda$  representing the sun's longitude counted from the true equinox of the date; and  $\lambda'$  the same coördinate counted from the mean equinox of the beginning of the year. A column of hourly differences enables the computer to obtain the sun's longitude for any hour from noon. The hourly differences of the logarithm of the radius vector are likewise given. The longitudes of the sun are the true longitudes, not affected by aberration. The latitude is referred to the ecliptic of the date.

The last column on page III. contains the *Mean Time of Sidereal 0<sup>h</sup>*, or  $24^{\text{h}}$ —the right ascension of the mean sun. It may be reduced to any meridian by interpolating for the longitude, or to any Greenwich *sidereal* time by means of the hourly difference, —  $9^{\text{s}}.8296$ . The reduction, however, can be taken directly from Table II. of the American Ephemeris, for *reducing intervals of sidereal time to mean solar time*, or approximately from Table LII. of Bowditch's *Navigator*.

This column is used in converting sidereal time to mean time. As an illustration, let us take Example 3, above.

Jan. 3, the mean time of Greenwich sidereal 0 <sup>h</sup> is	$5^{\text{h}} 8^{\text{m}} 12.61$
The H. D. — $9^{\text{s}}.8296 \times (-7.882)$ , or the red. for long., Table II.,	+ $1^{\text{m}} 17.48$
The mean time of local sid. 0 <sup>h</sup> ,	$5^{\text{h}} 9^{\text{m}} 30.09$
Add the given sidereal time,	$13^{\text{h}} 4^{\text{m}} 51.49 = 13^{\text{h}}.081$
The sum is	$18^{\text{h}} 14^{\text{m}} 21.58$
— $9^{\text{s}}.8296 \times 13.081$ , or the red. for $13^{\text{h}} 4^{\text{m}} 51^{\text{s}}$ in Table II.,	— $2^{\text{m}} 8.58$
The required astronomical mean time,	Jan. 3, $18^{\text{h}} 12^{\text{m}} 13.00$

It was readily seen, in advance, that the sum of the mean time of sidereal 0<sup>h</sup> and the given sidereal time would be less than  $24^{\text{h}}$ . Were it more than  $24^{\text{h}}$ , the mean time of sidereal 0<sup>h</sup> should be taken out for Jan. 2, that is the *preceding* astronomical day.

Page IV. contains the *Moon's Semidiameter and Equatorial Horizontal Parallax* for each mean noon and midnight at Greenwich. Columns adjoining those of the horizontal parallax give the change of this quantity in one hour, by means of which it can be reduced to any other Greenwich mean time in the same way as the sun's declination and the equation of time in the preceding examples. The sign *plus or minus* (+ or —) prefixed to the hourly differences, shows whether the horizontal parallax is increasing or decreasing.

The reduction of the moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.273. It may also be obtained from Table XI. of Bowditch's *Navigator*, or by simply computing the proportional part.

If, for example, the semidiameter of the moon is to be taken out for 1879, Mar. 20, 9<sup>h</sup> P. M. Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of Mar. 20 is  $3''.3$ ; then

$$\text{as } 12^{\text{h}} : 9^{\text{h}} = 3''.3 : 2''.5$$

which is the correction to be *subtracted from* the semidiameter at noon, because the semidiameter is *decreasing*. The moon's semidiameter then, for Mar. 20, 9<sup>h</sup>, is,  $15' 2''.6 - 2''.5$ , or  $15' 0''.1$ .

The moon's semidiameter and horizontal parallax are required for all observations of the moon. When great precision is needed, the hourly differences should be first interpolated for *half* the interval of Greenwich time from noon or midnight, and a correction applied to the horizontal parallax for the latitude of the place of observation.

The *Mean Time of the Moon's Meridian Passage* at Greenwich, which is given on page IV. to minutes and tenths of minutes, is also accompanied with a column of differences for one hour of longitude, by means of which, having the longitude turned into time, the time of the moon's meridian passage at any other place may be computed. The reduction may be taken from BOWDITCH'S Table XXVIII. by simple inspection. The last column of this page contains the *Age* of the Moon, or the time elapsed since the preceding new moon, to tenths of days.

Pages V. to XII., inclusive, contain the *Moon's Right Ascension* and *Declination* for each day and hour of Greenwich *mean* time. They are accompanied with columns of *differences for one minute*, which are also given at each hour. The right ascension and declination of the moon change so rapidly, that, if they were not given at frequent intervals, the moon would cease to be useful to the practical navigator as a means of determining the latitude and time. The Greenwich mean time, which is required for taking out these quantities, may be taken directly from a well-regulated chronometer, or obtained by applying the longitude, turned into time, to the local mean time of the observer. The right ascension or declination is taken out for the day and hour of the Greenwich *mean* time; the *diff. for 1<sup>m</sup>* multiplied by the *minutes* and parts of a minute of the Greenwich time; and the product added to, or subtracted from, the quantity, according as the quantity is increasing or decreasing.

Thus, suppose the moon's right ascension and declination are required for 1879, Nov. 1, 2<sup>h</sup> 15<sup>m</sup> 20<sup>s</sup>, astronomical mean time at Greenwich :

	<i>Right Ascension.</i>	<i>Declination</i>
Nov. 1, 2 <sup>h</sup>	<sup>h</sup> 4 13 21.80	24° 37' 52.9" N
Diff. 2 <sup>h</sup> .1539 × 15.333	= + 33.03	3'' .380 × 15.333 = 51.8 N
Nov. 1, 2 <sup>h</sup> 15 <sup>m</sup> 20 <sup>s</sup>	<u>4 13 54.83</u>	<u>24 38 44.7 N.</u>

The differences interpolated for 7<sup>m</sup>.67 = 0<sup>h</sup>.13 are for the right ascension 2<sup>h</sup>.1542, and for the declination 3'' .366, which may be used for greater precision.

Page XII. contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the earth.

Pages XIII. to XVIII., inclusive, contain the *Lunar Distances*, or the angular distances of the centre of the moon from the centre of the sun, the four larger planets, and certain fixed stars, as they would appear to an observer at the centre of the earth. They are given for every third hour of Greenwich mean time, beginning at noon; the dates are therefore *astronomical*. All the distances that can be observed on the same day are grouped together under that date; and the columns are read from left to right, across both pages of the same opening. The letter W., or E., is affixed to the name of the sun, planet, or star, to indicate that it is on the west, or east, side of the moon.

An observer on the earth's surface having measured a *Lunar Distance*, corrected it for errors of his instrument and for the semidiameter of the objects, and cleared it from the effects of refraction and parallax, finds the *true*, or *geocentric*, distance. With this distance and the distances in the Ephemeris of the same bodies on the same day, the *Greenwich mean time* of the observation can be found.

To lessen the labor of computation, there is given in the Ephemeris, between every two successive distances, the *logarithm of the seconds of time in which the distance changes 1"*, or, as it is usually called, the *proportional logarithm of the difference*. It is given for the *middle* instant of the two hours between which it is placed.

For computing the *Greenwich time* we have the following rule:

Find in the Almanac the two distances between which the true distance falls; take out the nearest of these, the hours of Greenwich time over it, and the *P. L. of Diff.* between them:

Find the difference between the true distance and the distance taken from the Almanac; and from the *proportional logarithm* of this difference subtract the *P. L. of Diff.* taken from the Almanac:

The result is the *proportional logarithm* of an interval of time to be *added* to the hours of Greenwich time, taken from the Almanac, when the *earlier* Almanac distance is used; to be *subtracted* from the hours of Greenwich time, when the *later* Almanac distance is used.

Another method is, to *add* the *common logarithm* of the difference of the true and the Almanac distances to the *P. L. of Diff.* of the Almanac; the sum will be the *common logarithm* of the correction to be applied to the hours of Greenwich time. The Table of *Logarithms of small Arcs in Space or Time*, given at the end of the volume for 1871, saves the operation of reducing degrees (or hours) and minutes to seconds, and the reverse.

As the *P. L. of Diff.* in the Ephemeris varies, the Greenwich time, found by the methods just described, may not be sufficiently exact. To correct it for such variation, or *2d difference*, take the difference between the *P. L. of Diff.* used and the one which follows it in the Ephemeris, (or, more strictly, half the difference of the preceding and following ones.) With this difference, and the first correction of the Greenwich time already found, enter Table I. Appendix, and take out the corresponding seconds, which are to be *added* to the approximate Greenwich time if the *Prop. Logs.* in the Ephemeris are *decreasing*; to be *subtracted* if they are *increasing*.

Thus the *Greenwich mean time* of the observation can be obtained. If the observer has noted the time of observation by a chronometer, the difference of this chronometer time and the Greenwich mean time will be the *error* of the chronometer as found from the Lunar Distance. The agreement or disagreement of this error with that brought up from the error and rate of a previous date, may show whether the chronometer has run well or ill. In this way Lunar Distances can be used as a check upon the chronometer. By a series of carefully observed Lunar Distances on both sides of the moon, the chronometer error can be tolerably well ascertained.

If the observer has found the *local mean time* of observation from the observed altitude of one of the bodies, or by a watch regulated to that time by recent observations and corrected for change of longitude in the interval, the difference of this local time and the Greenwich time found from the Lunar Distance will be his longitude.

As an example of finding the Greenwich mean time from a Lunar Distance, suppose that in 1879, May 9, about 2<sup>h</sup> of Greenwich astronomical time, the corrected distance of the moon's centre from Mars is 63° 17' 43":

Corrected distance,	63 17 43	
Distance in the Ephemeris, May 9, 0 <sup>h</sup> 0 <sup>m</sup> 0 <sup>s</sup> ,	64 21 25	P. L. .2513
Difference,	1 3 42	P. L. .4511
Time from 0 <sup>h</sup> ( <i>after</i> )	+ 1 53 37	P. L. .1996
Corr. for 2d Diff., Table I,	— 6	
Greenwich Mean Time, May. 9,	1 53 31	

By a Table of common logarithms, or a Table of logarithms of small arcs, the reduction of the Greenwich time would be found thus:

From Ephemeris,	P. L. 0.2513
Diff. of distances, 1° 3' 42" = 3822"	log 3.5823
Red. of Greenwich time, + 1 <sup>h</sup> 53 <sup>m</sup> 37 <sup>s</sup> = 6817 <sup>s</sup>	log 3.8336

the result being the same as by the previous method.



Pages 218 to 241, inclusive, contain the ephemerides of the four principal planets, Venus, Mars, Jupiter, and Saturn. The ephemeris of each consists of its *Apparent Right Ascension* and *Declination*, and their *Variations in one hour*, for each Greenwich mean noon; *Mean Time of its Meridian Passage*; and, at the bottom of the page, its *Semidiameter* and *Horizontal Parallax*.

North declinations are marked +, south declinations —. + prefixed to the change of declination of the sun, moon, a planet, or a star, indicates that north declinations are increasing, or south declinations are decreasing; — indicates that north declinations are decreasing, south declinations increasing.

The right ascension and declination of a planet are required in all observations of it for time, latitude, or azimuth. The mode of reducing them to any instant of Greenwich mean time is the same as in the examples of the sun previously given. The mean time of passage across any meridian can be found by dividing the *daily* difference by 24, and using the *hourly* difference thus obtained, as in the case of the moon; or, the reduction can be found by the proportion: As  $24^h$  (or  $360^\circ$ ) is to the longitude, so is the daily difference to the reduction required.

Pages 259 to 262 contain the *Mean Places*, with their *annual variations*, of one hundred and ninety-eight Fixed Stars for the beginning of the year 1879.

The right ascension of a star is also the *sidereal time* of its meridian passage. From this we may roughly find the mean time of meridian passage by adding the *mean time of sidereal 0<sup>h</sup>* on page III. of the Calendar, or subtracting the *sidereal time of mean noon* on page II., (disregarding seconds;) but we can find it more exactly by the processes already given for converting sidereal time to mean time.

The right ascension and declination of a star are required when it has been observed for time, latitude, or azimuth. The mean places are sufficiently accurate for most observations at sea; but for more exact observations, the *apparent* places should be used.

## THE ASTRONOMICAL PART.

This part is adapted to the meridian of Washington; and Washington time, *astronomical* or *sidereal*, is required in its use. The longitude of Washington from Greenwich is assumed to be  $+5^h 8^m 12^s$ .

*Obliquity of the Ecliptic, &c.*, page 248.—This page contains for every ten days of the year the *Apparent Obliquity*, which is required for the transformation of longitudes and latitudes to right ascensions and declinations, or the reverse; the *Equation of Equinoxes* in longitude and right ascension, or the reduction from the *mean* to the *true* equinox of the date; the *Precession of Equinoxes* in longitude, or the reduction of longitudes from the mean equinox of the *beginning* of the year to the mean equinox of the *date*; the *Sun's Aberration*, which is to be applied to the *true* longitude of the sun, as given in the *Ephemeris*, to obtain its *apparent* longitude; the *Sun's Horizontal Parallax*; and the *Mean Longitude of the Moon's Ascending Node*.

At the bottom of the page are given the *Mean Obliquity* for the beginning of the year; the *Annual Precession* for the middle of the year, the precession in a sidereal and in a solar day, and the *daily motion* of the moon's node in longitude.

*Fixed Stars*.—Pages 249–257 contain for each mean midnight the logarithms of *A, B, C, D*, also *f, G, H, i*, and logarithms of *g, h, and i*, (following BESSEL's notation,) for reducing the *mean* places of the Fixed Stars at the beginning of the year to their *apparent* places on any day.

The formulæ by which they are prepared, and those in which they are used, are given on page 258. The coefficients are those of PETERS and STRUVE. In terms of right ascension they are expressed in time.

The first set of quantities requires for the star the logarithms of *a, b, c, d, a', b', c', d'*, which are to be found in the Star Catalogues. The other set requires no other star constants than the right ascensions and declinations. *f, G, and H* are given in time, as well as arc, to facilitate their use with tables of sines, &c., which have the argument in time. Such a table is given in the Appendix.

Tables IV., VI. and VII., in the Appendix, facilitate the computation of terms depending on  $2\epsilon$  and  $\epsilon - 1'$ .

For a star near the pole, it is best to compute the reductions with the mean right ascension and declination at the date instead of the beginning of the year, (or the logarithms of *a, b, c, &c.*, reduced to the date), and add such of the following terms as may be of sufficient magnitude:

In Right Ascension.	In Declination.
$+ 0^{\circ}.000003 \tau^2 \sin \alpha \left. \begin{array}{l} \\ \end{array} \right\} \tan \delta$	$+ 0''.000975 \tau^2 \sin^2 \alpha$
$- 0^{\circ}.000149 \tau^2 \cos \alpha \left. \begin{array}{l} \\ \end{array} \right\} \tan \delta$	$- 0''.000023 \cos 2 \Omega$
$- 0^{\circ}.0000650 \tau^2 \sin 2 \alpha$	$- 0''.000080 \cos 2 \Omega \cos 2 \alpha$
$+ 0^{\circ}.0000103 \sin 2 \Omega \cos 2 \alpha \left. \begin{array}{l} \\ \end{array} \right\} \tan^2 \delta$	$- 0''.000077 \sin 2 \Omega \sin 2 \alpha$
$- 0^{\circ}.0000107 \cos 2 \Omega \sin 2 \alpha \left. \begin{array}{l} \\ \end{array} \right\} \tan^2 \delta$	$+ 0''.000040 \cos 2 \odot \cos 2 \alpha$
$+ 0^{\circ}.0000620 \sin 2 \odot \cos 2 \alpha \left. \begin{array}{l} \\ \end{array} \right\} \sec^2 \delta$	$- 0''.000467 \cos 2 \odot \cos 2 \alpha$
$- 0^{\circ}.0000622 \cos 2 \odot \sin 2 \alpha \left. \begin{array}{l} \\ \end{array} \right\} \sec^2 \delta$	$- 0''.000465 \sin 2 \odot \sin 2 \alpha$
$+ 0^{\circ}.0000513 \sin (\odot + \Omega) \cos 2 \alpha \left. \begin{array}{l} \\ \end{array} \right\} \tan \delta \sec \delta$	$- 0''.000004 \cos (\odot + \Omega)$
$- 0^{\circ}.0000507 \cos (\odot + \Omega) \sin 2 \alpha \left. \begin{array}{l} \\ \end{array} \right\} \tan \delta \sec \delta$	$- 0''.00038 \cos (\odot + \Omega) \cos 2 \alpha$
$+ 0^{\circ}.0000097 \sin (\odot - \Omega) \cos 2 \alpha \left. \begin{array}{l} \\ \end{array} \right\} \tan \delta \sec \delta$	$- 0''.00038 \sin (\odot + \Omega) \sin 2 \alpha$
$- 0^{\circ}.0000053 \cos (\odot - \Omega) \sin 2 \alpha \left. \begin{array}{l} \\ \end{array} \right\} \tan \delta \sec \delta$	$+ 0''.00038 \cos (\odot - \Omega)$
	$- 0''.000004 \cos (\odot - \Omega) \cos 2 \alpha$
	$- 0''.000007 \sin (\odot - \Omega) \sin 2 \alpha$

Pages 259–262 contain the *mean places* and *annual variations* of 198 Fixed Stars for 1879, Jan.  $0^h + .016$ , or the instant when the sun's mean longitude is  $280^\circ$ .  $\tau$  on the preceding pages is reckoned from the same epoch. Stars within  $25^\circ$  of either pole are designated by a \*.

The *apparent* places of  $\alpha, \delta$ , and  $\lambda$  Ursæ Minoris, and of 51 Cephei, are given on pages 263–274 for every upper transit at Washington. They include the terms depending on  $2\epsilon$  and  $\epsilon - 1'$ , as well as other small terms given above and on page 258, so far as they were of sufficient importance.

The *apparent* places of the remaining 194 stars follow on pages 275–323, in the order of their right ascensions. They are given for every tenth transit, together with their motions in ten days; and include all terms of the preceding formulæ exceeding 0°.003 in right ascension, or 0′.03 in declination, except those which depend on  $2\epsilon$  and  $\epsilon - \Gamma'$ . The mean solar time of transit is also given to the nearest tenth of a day.

*Solar Ephemeris.*—Pages 324–329 contain the *Apparent Right Ascension* and *Declination* of the SUN for each mean and apparent noon at Washington; the *Hourly Motion* at mean noon; the *Equation of Time* at apparent noon with the sign of its application to apparent time; the SUN's *Semidiameter* and the *Sidereal Time of its passing the Meridian*; and the *Sidereal Time of Mean Noon*. The explanation of these quantities and their use has already been given on pages 478–481.

The SUN's *Horizontal Parallax* is given on page 248.

*Moon-Culminations.*—Pages 330–332 contain the mean solar time of the *Upper Transit* of the MOON's centre at Washington, expressed to hundredths of a minute, the *difference* for one hour of longitude, and the *Sidereal Time of Semidiameter passing the Meridian*, both given for the instant of transit at Washington. The numbers in the fifth column indicate the STARS in the list of *Moon-Culminating Stars*, pages 333–336, within 30<sup>m</sup> of the moon in right ascension. Those nearest the moon in declination are proper to be observed with the moon at each transit. The *bright Limb* of the Moon is indicated by the Roman numerals in the last column.

The time of transit at any place, within six hours of Washington in longitude, may be found with sufficient accuracy from the time of the Washington transit by using the hourly difference interpolated for a longitude from Washington equal to *half* that of the given place. With this time reduced to Greenwich time the moon's right ascension can be taken from the Lunar Ephemeris, pages V–XII of each month, as in the example on page 482. If greater precision is required, or the place is more than six hours from Washington, we may, from the right ascension thus obtained, (which is nearly the *local sidereal time*,) find the *local mean time*, as on page 481, more accurately than before, and thence the *Greenwich mean time*, and with this revise the computation.

As an example, suppose the right ascension of the bright limb of the moon to be required at the transit of January 8, 1879, at Berlin, in longitude

$$\begin{array}{r} 6^{\text{h}} \ 1^{\text{m}} \ 47.50^{\text{s}} = 6.0299 = 0.2512 \text{ East of Washington.} \\ 0 \ 53 \ 35.50 \qquad \qquad \qquad \text{Greenwich.} \end{array}$$

Transit at Washington, (p. 330) . . . . .	Jan. 8,	12 <sup>h</sup> 47.40 <sup>m</sup>
Corr. for longitude . . . . .	—	13.57
Transit at Berlin, . . . . .	Jan. 8,	12 33.83
Longitude from Greenwich, . . . . .	—	53.59
Greenwich mean time, . . . . .	Jan. 8,	11 40.24
Moon's R. A., Jan. 8, 12 <sup>h</sup> 0 <sup>m</sup> . . . . .		7 <sup>h</sup> 47 <sup>m</sup> 10.99 <sup>s</sup>
Reduction for — 19.76 . . . . .	—	46.30
Moon's R. A., Jan. 8, 11 40.24 . . . . .		7 46 24.69
Sid. time of semidiameter passing, . . . . .	+	1 10.72
R. A. of ll, or bright limb, . . . . .		7 47 35.41

The diff. for 1<sup>h</sup> of long., 2<sup>m</sup>.251, is found by interpolating *back* 0<sup>d</sup>.126 from that given on page 330; and 2<sup>m</sup>.3434, the change of R. A. in 1<sup>m</sup>, by interpolating *back* 10<sup>m</sup> from that given on page 7 for Jan. 8, 12<sup>h</sup>. The time of the semidiameter passing the meridian is interpolated *back* 0<sup>d</sup>.2512 from that given on page 330, for Jan. 8, and is added to the right ascension of the centre, as the bright limb is ll., or the following one.

The Greenwich mean time computed from the right ascension of the centre is 11<sup>h</sup> 40<sup>m</sup> 14<sup>s</sup>.61 and the consequent correction of that right ascension is less than 0<sup>d</sup>.01.

*Moon-Culminating Stars*, pages 333–336.—The *mean* places, with their annual variations, of 203 stars near the moon's path are given for the beginning of the fictitious year (1879, Jan. 0<sup>d</sup> +.016). The names of those whose *apparent* places are given in the *Ephemeris* of the *Fixed Stars* are printed in SMALL CAPITALS.

The *apparent* places of the others may be obtained by the quantities and formulæ on pages 249–258. To illustrate the use of these, suppose the apparent place of  $\kappa$  Geminorum, one of the stars proper to be observed with the moon on January 8, be required at its transit of that date at Berlin.

The Washington mean time of the star's transit at Berlin is January 8, 6<sup>h</sup> 21<sup>m</sup>, (11<sup>m</sup> before that of the moon,) or 04.23 before midnight of January 8. The quantities from page 249, or page 252, are to be taken out for this time.

## FIRST METHOD.

(Star Tables)	log $a$	0.560	log $b$	8.100 $\pi$	log $c$	8.480 $\pi$	log $d$	8.825
(p. 249)	log $A$	9.499	log $B$	0.686 $\pi$	log $C$	0.776 $\pi$	log $D$	1.288
(Star Tables)	log $a'$	0.916 $\pi$	log $b'$	9.960 $\pi$	log $c'$	8.127	log $d'$	9.235 $\pi$
	log $Aa$	0.059	log $Bb$	8.786	log $Cc$	9.256	log $Dd$	0.113
	log $Aa'$	0.415 $\pi$	log $Bb'$	0.646	log $Cc'$	8.903 $\pi$	log $Dd'$	0.523 $\pi$
(p. 334)	$\alpha = 7^{\circ} 37' 8.44''$			$\delta = +24^{\circ} 41' 10.9''$				
	$Aa = + 1.146$			$Aa' = - 2.50$				
	$Bb = + 0.061$			$Bb' = + 4.43$				
	$Cc = + 0.180$			$Cc' = - 0.08$				
	$Dd = + 1.298$			$Dd' = - 3.34$				
	$\mu = 0^{\circ}.000$			$\mu' = - 0''.05$				
	$\tau\mu = 0.000$			$\tau\mu' = 0.00$				
	<i>Apparent Place</i> , $\alpha' = 7^{\circ} 37' 11.13''$			$\delta' = + 24^{\circ} 41' 9.3''$				

## SECOND METHOD.

$\alpha = 7^{\circ} 37.1'$		$\delta = +24^{\circ} 41'$	
$G = 21^{\circ} 29.9'$		$G + \alpha = 5^{\circ} 7.0' = 76^{\circ} 45.0'$	
$H = 22^{\circ} 52.2'$		$H + \alpha = 6^{\circ} 29.3' = 97^{\circ} 19.5'$	
log $\frac{1}{r}$	8.824	log $\frac{1}{r}$	8.824
log $g$	0.901	log $h$	1.307
l. sin $(G + \alpha)$	9.988	l. sin $(H + \alpha)$	9.996
l. tan $\delta$	9.662	l. sec $\delta$	0.043
log $(g)$	9.375	log $(h)$	0.169
<i>Apparent Right Ascension</i> . . . . .		$\alpha' = 7^{\circ} 37' 11.13''$	
log $g$	0.901	log $h$	1.307
l. cos $(G + \alpha)$	9.360	l. cos $(H + \alpha)$	9.105 $\pi$
log $(g')$	0.261	l. sin $\delta$	9.621 $\pi$
		log $(h')$	0.033 $\pi$
log $i$	0.410 $\pi$		
l. cos $\delta$	9.958		
log $(i)$	0.368 $\pi$		
<i>Apparent Declination</i> . . . . .		$\delta' = + 24^{\circ} 41' 9.3''$	

The Moon's *Semidiameter* and *Equatorial Horizontal Parallax* for each mean noon and midnight are on pages 337–340.\* In the moon's ephemeris, as in that of the sun, the hourly motions belong to the instants for which they are given. The hourly change of semidiameter is equal to .2723 times that of the horizontal parallax.

\* For eclipses and occultations, BURCKHARDT'S value of the semidiameter, which is 2'.5 less, is preferred.

The times of the *Moon's Phases, Apogee, Perigee, and greatest Libration*, are given on page 341; the position of the *Moon's Equator* and the *Moon's mean longitude* on page 342; and a Table for computing the *Libration* of the Moon on page 343.

The *Ephemerides of the seven principal Planets* (pages 344–385) are given both for *mean noon* and the time of *transit*. The *hourly differences* are also given for the same instants. Third differences were used in their computation.

The *Horizontal Parallaxes, Vertical Semidiameters, and Sidereal Times of the Semidiameters passing the Meridian*, are on pages 386 and 387.

The *Sun's Coördinates* (pages 388–399) are given for each mean noon and midnight, referred to the apparent equinox and equator, and also to the mean equinox and equator at the beginning of the year, (Jan. 0<sup>d</sup>.0.) In the case of the rectangular coördinates, only the last four decimals are given for the mean equinox and equator, and the first three places are to be taken from the apparent equinox and equator. When a change of a unit is to be made in the third place, it is indicated by a corresponding colon (:). The latitude is referred to the ecliptic of the date. The reduction to the mean ecliptic of Jan. 0, is  $+0''.488 \mp \sin (\odot + 187^\circ)$ , in which  $\tau$  is the time from Jan. 0, in parts of a year.

The *Heliocentric Coördinates* of the Planets (pages 400–406) are referred to the mean equinox and ecliptic of the mean noon of the 2405,000th day of the Julian Period, or 1872, July 25.

The columns  $-\frac{k^2}{r^3}x$ , &c., contain the quantities  $-1600m\frac{k^2}{r^3}x$ ,  $-1600m\frac{k^2}{r^3}y$ ,  $-1600m\frac{k^2}{r^3}z$ , in units of the 7th decimal place, in which  $m$  denotes the mass of the planet, and  $k^2$  the unit of attractive force in the solar system, or  $\log k = 8.2355814$ .

Page 407 contains the *Inclinations and Longitudes of the Ascending Nodes* at the same epoch, and the *Masses* of the several Planets with their logarithms. The changes of the Inclinations and Nodes in 100 days are also given.

The Heliocentric Coördinates and Masses of the Planets are given for the computation of perturbations.

*Eclipses.*—Pages 408–414 contain the elements necessary for computation and the principal phases of each eclipse of the SUN and MOON. The semidiameters of the moon are  $2''.5$ , and those of the sun  $2''.2$ , less than those in the Ephemeris.

The charts of the *Solar Eclipses* show the part of the world in which each is visible. The dotted curves pass through places where the eclipse begins, or ends, at an exact hour of Washington mean time, and aid in finding an approximate time of the beginning, or end, at any place. The limits and central line will give some idea of the magnitude of the eclipse. The longitudes are reckoned west from Washington.

The Tables of *Data of the Solar Eclipses* contain certain quantities\* derived from the elements and independent of the place of observation. They are given for successive times at the Washington meridian; and if their values for the *Penumbra* be taken out for a time  $T_0$ , assumed near that of the beginning, or end, of the eclipse at any place, the prediction for that place may be computed quite accurately by the following formulæ:

Let  $\varphi$  = the latitude of the place,  $+$  when north,

$\lambda$  = its longitude from Washington,  $+$  when west,

(Bessel,)  $\log e = 8.912205$ ,  $\log (1 - e^2) = 9.9970916$ ,  $\sin \chi = e \sin \varphi$ ,

$h = \sec \chi \cos \varphi$ ,  $k = (1 - e^2) \sec \chi \sin \varphi$ ,

$a = A - h \sin (\mu - \lambda)$ ,

$b = B - E k + G h \cos (\mu - \lambda)$ ,

$c = -C + F k - H h \cos (\mu - \lambda)$ ,

$m = \sqrt{b c}$  (usually with same sign as  $a$ ).

\*The formulæ are given in CHAUVENET'S *Spherical and Practical Astronomy*, Vol. 1, page 513. The changes of  $A$ ,  $B$ , and  $C$  for one minute, or one second, are expressed in units of the sixth decimal place.

If  $m = a$ , the time  $T_0$  is correctly chosen. If  $m$  differ from  $a$ , a correction  $t$  of the assumed time may be obtained in seconds by the formulæ,

$$\begin{aligned}\log \mu' &= 1.86167, & a' &= A' - \mu' h \cos (\mu - \lambda_s) \\ \tan \frac{1}{2} Q &= \frac{c}{m} = \frac{m}{b} & b' &= B' - \mu' G h \sin (\mu - \lambda_s) \\ t &= \frac{1000000 (m - a)}{a' + b' \cot Q}\end{aligned}$$

and a new approximation to the actual Washington time will be

$$T_0' = T_0 + t,$$

with which the computation may be revised.

Thus successive approximations are made until for the last assumed time  $T_0$ ,  $m = a$  very closely, and  $t$  is quite small. The local mean time of the phenomenon will be, using the last values of  $T_0$  and  $t$ ,

$$T_0 + t - \lambda.$$

$Q$  must be taken of the same sign with  $a$ , and is a sufficiently near approximation to the angular distance of the point of contact reckoned from the *north* point of the sun's limb, + towards the *east*.

For a total or annular eclipse, the prediction of the interior contacts may be made in the same way, using the *Data* for the *Shadow*; except that  $Q$  will have a sign opposite that of  $a$  in a total eclipse.

To find  $V$ , the angular distance of the point of contact from the *Vertex* of the sun's limb, + towards the *left*, we have the formulæ

$$\begin{aligned}p \sin P &= \sin \varphi & c \sin C &= \cos P \tan (\mu - \lambda) \\ p \cos P &= \cos \varphi \cos (\mu - \lambda) & c \cos C &= \sin (P - \delta') \\ V &= Q - C,\end{aligned}$$

in which  $\delta'$  is the sun's declination.

If the values of  $Q$  at the beginning and at the end of the eclipse be found, and their difference (with regard to signs) be denoted by  $2\theta$ , the number of digits eclipsed is

$$12(1+n) \sin^2 \frac{1}{2} \theta, \quad \text{or } 12(1+n) \cos^2 \frac{1}{2} \theta,$$

according as  $\theta$  is acute or obtuse;  $n$  being the quotient of the semidiameter of the moon divided by that of the sun.

$\theta$  may also be found from the formulæ:

$$\tan R = \frac{b'}{a'} \quad \theta = Q + R$$

(in which  $R$  has the sign of  $b'$ ); and the expression of  $t$  may be changed to

$$t = 1000000 \cdot \frac{m - a}{a'} \cdot \frac{\sin Q \cos R}{\sin \theta}.$$

The following is an example of the computation of the beginning of the Eclipse of January 21, 1879, for the Observatory at the Cape of Good Hope, for which

$$\varphi = -33^\circ 56' 3''.2 \quad \lambda = 264^\circ 27' 58''.7$$

(1)	$\log c = 8.912205$		
(2)	$\text{l. sin } \varphi = 9.7468215 n$	(1) + (2)	$\text{l. sin } \chi = 8.659026 n$
(3)	$\log (1 - e^2) = 9.9970916$		
(4)	$\text{l. sec } \chi = 0.0004521$	(2) + (3) + (4)	$\log k = 9.7443652 n$
(5)	$\text{l. cos } \varphi = 9.9189101$	(4) + (5)	$\log h = 9.9193622$

By the chart, or a preliminary computation, the Washington mean time of the beginning of the eclipse at the Cape of Good Hope is  $17^h 26^m$ , for which we take from the table for *Penumbra*, on page 408, the values of  $A$ ,  $B$ ,  $C$ , &c.

Computation of  $t$ , the correction of  $T_0$ .

		$\mu = 258^{\circ} 33' 1.6''$ (9)	$\log E = 9.973045$
		$\mu - \lambda = 354^{\circ} 5' 2.9''$ (10)	$\log k = 9.744365 n$
(1)	$\text{l. sin } (\mu - \lambda)$	$= 9.0131234 n$ (11)	$\log F = 9.974524$
(2)	$\log h$	$= 9.9193622$	$\log Ek = 9.717410 n$
(3)	$\text{l. cos } (\mu - \lambda)$	$= 9.9976809$ (10) + (11)	$\log Fk = 9.718889 n$
		(12)	$A = -0.60961$
(4) = (1) + (2)	$\log h \sin (\mu - \lambda)$	$= 8.9324856 n$ (13)	$-h \sin (\mu - \lambda) = +0.08560$
(5)	$\log \mu'$	$= 1.86167$	
(6)	$\log G$	$= 9.533640 n$ (14)	$B = +0.16021$
(7) = (2) + (3)	$\log h \cos (\mu - \lambda)$	$= 9.9170431$ (15)	$-Ek = +0.52169$
(8)	$\log H$	$= 9.522118 n$ (16)	$Gh \cos (\mu - \lambda) = -0.28228$
(6) + (7)	$\log Gh \cos (\mu - \lambda)$	$= 9.450683 n$ (17)	$-C = +0.95772$
(7) + (8)	$\log Hh \cos (\mu - \lambda)$	$= 9.439161 n$ (18)	$Fk = -0.52347$
		(19)	$-Hh \cos (\mu - \lambda) = +0.27489$
(5) + (7)	$\log \mu' h \cos (\mu - \lambda)$	$= 1.77871$	(12) + (13) $a = -0.52401$
(4) + (5) + (6)	$\log \mu' Gh \sin (\mu - \lambda)$	$= 0.32780$	(14) + (15) + (16) $b = +0.39962$
			(17) + (18) + (19) $c = +0.70914$
(20)	$\log b = 9.601647$		$m = -0.53234$
(21)	$\log c = 9.850732$		$m - a = -0.00633$
(22) = $\frac{1}{2} [(20) + (21)]$	$\log m = 9.726190 n$		
(22) - (20) = (21) - (22)	$\text{l. tan } \frac{1}{2} Q = 0.124543 n$		
Angle from $N$ . point,	$Q = -106^{\circ} 12'.6$	(23)	$A' = +141.01$
(29)	$\text{l. cot } Q = 9.46347$	(24)	$-\mu' h \cos (\mu - \lambda) = -60.08$
(30)	$\log b' = 1.65858$	(25)	$B' = +47.69$
(29) + (30)	$\log b' \cot Q = 1.12205$	(26)	$-\mu' Gh \sin (\mu - \lambda) = -2.13$
(31)	$\log (m - a) + 6 = 3.9206 n$	(25) + (26)	$b' = +45.56$
(32)	$\log (a' + b' \cot Q) = 1.9739$	(27) = (23) + (24)	$a' = +80.93$
(31) - (32)	$\log t = 1.9467 n$	(28)	$b' \cot Q = +13.24$
		(27) + (28)	$a' + b' \cot Q = +94.17$

Assumed time, . . . . .  $T_0 = 17^h 26^m 0.0$   
 Correction of the assumed time, . . . . .  $t = -1^h 28.4$   
 Washington time of beginning, . . . . . July 21, 17 24 31.6  
 Local time of beginning, . . . . . " 23 46 39.7

We have also  $C = -159^{\circ} 51'$ ; the angle from the *Vertex*,  $V = 53^{\circ} 12'$ ;  $\theta = -77^{\circ} 16'$ , and the magnitude of the eclipse 9.1 digits, or 0.76 of the sun's disc, on the north limb.

*Occultations.*—Pages 415–448 contain *Elements for facilitating the Prediction of Occultations of Planets and Stars by the Moon*. The list includes all stars to the  $6\frac{1}{2}$  magnitude in the *Catalogue of the British Association*, and a few others of less magnitude contained in the *Almanac Catalogue of Zodiacal Stars* and chiefly belonging to clusters, which can be occulted during the year 1879.

Pages 449–451 contain a list of such occultations and near approaches as will be visible at Washington during the year 1879. For the latter, the time of nearest approach, the nearest point of the moon's limb and the distance of the star from the moon's limb, are stated.

The elements comprise the *Date, the Name, Magnitude and Declination of the Star*, the *Limiting Latitudes* within which the occultation may be visible, and at the time of geocentric conjunction of the moon and star in right ascension the following quantities:

$$\begin{aligned} \delta &= \text{Washington mean time,} \\ H &= \text{Hour angle of the star at Washington, + when west;} \\ X &= \frac{15 (\alpha - \alpha')}{\pi} \cos \delta = 0, \quad Y = \frac{\delta - \delta'}{\pi}, \\ x' &= \frac{15 \Delta \alpha}{\pi} \cos \delta, \quad y' = \frac{\Delta \delta}{\pi}, \text{ the hourly changes of } x \text{ and } y; \end{aligned}$$

in which  $\alpha$  and  $\delta$  are the apparent right ascension and declination of the moon,

$\Delta \alpha$  and  $\Delta \delta$ , their motions in one hour of mean time,

$\pi$ , the moon's equatorial horizontal parallax,

$\alpha'$  and  $\delta'$ , the apparent right ascension and declination of the star.

The reductions of the mean place of the star at the beginning of the year to its apparent place at the date, are also given to facilitate the reduction of observed occultations.

For any other Washington mean time,  $T = \delta + t$ , we have ( $\mu$  being the sidereal equivalent of  $t$ , and  $t$  as a coefficient being expressed in hours)

$$h = H + \mu, \text{ the star's hour angle at Washington,}$$

$$x = t x', \quad y = Y + t y'.$$

As the moon's motion is here regarded as uniform, the expressions for  $x$  and  $y$  are more nearly correct the smaller the interval  $t$ . The exact values, to be employed in the reduction of an observed occultation, are

$$x = \frac{\sin(\alpha - \alpha') \cos \delta}{\sin \pi}$$

$$y = \frac{\sin(\delta - \delta') \cos^2 \frac{1}{2}(\alpha - \alpha') + \sin(\delta + \delta') \sin^2 \frac{1}{2}(\alpha - \alpha')}{\sin \pi}$$

in which  $\alpha$ ,  $\delta$  and  $\pi$  are to be taken from the ephemeris for the time of observation. But for predicting the times of *immersion* and *emersion*, and the points on the moon's limb where these appearances take place, the preceding expressions suffice to enable the observer to determine when and where to watch for these phenomena.

For the place of observation, let

$\varphi$  = its latitude, + when north;

$\lambda$  = its longitude from Washington, + when west;

$$(\text{Bessel.}) \log e = 8.9122 \ 05, \quad \log(1 - e^2) = 9.9970 \ 916,$$

$$\sin \chi = e \sin \varphi, \quad E = (1 - e^2) \sec \chi, \quad F = \sec \chi.$$

$$\mu' = 54147.8 \sin 1'', \quad \log \mu' = 9.41916.$$

The constants for the place, required both in the prediction of occultations and the reduction of those observed, are  $\varphi$ ,  $\lambda$ , and  $E \sin \varphi$ ,  $F \cos \varphi$ ,  $\mu' F \cos \varphi$ , or their logarithms.

The values of  $E$  and  $F$  and their logarithms are given for different latitudes in the following table:

$\varphi$	$E$ .	$F$ .	Log $E$ .	Log $F$ .
0°	1—.0067	1.0000	9.9971	0.0000
± 10	1—.0066	1.0000	9.9971	0.0000
20	1—.0063	1.0004	9.9973	0.0002
30	1—.0059	1.0008	9.9975	0.0004
40	1—.0053	1.0014	9.9977	0.0006
50	1—.0047	1.0020	9.9979	0.0009
60	1—.0042	1.0025	9.9982	0.0011
70	1—.0037	1.0030	9.9984	0.0013
80	1—.0034	1.0033	9.9985	0.0014
90	1—.0033	1.0034	9.9985	0.0014

An occultation will not be visible unless,

1. The latitude of the place is included within the limiting parallels:
2. At the time of occultation, or the local mean time ( $T - \lambda$ ), the sun is sufficiently below the horizon;



3. At that time the star is above the horizon, or its local hour angle ( $h-\lambda$ ) is numerically less than  $\tau$  found by the formula

$$\cos \tau = -\tan \varphi \tan \delta',$$

A table of  $\tau$ , or the hour angle of a body in the horizon, computed for the latitude of the place and different declinations, will be useful for such comparisons.

These conditions can generally be determined in advance, as in latitudes less than  $60^\circ$  ( $\delta-\lambda$ ) may be used instead of ( $T-\lambda$ ) except within two hours of sunrise or sunset; and ( $H-\lambda$ ) instead of ( $h-\lambda$ ) except within half an hour of the star's rising or setting. For these exceptional cases, which, however, are not favorable for observation, the time of *apparent* conjunction in right ascension, or some nearer approximation to the time of occultation, can be subsequently employed.

Having ascertained that an occultation will be visible, we may proceed to compute the times of immersion and emersion by the following formulæ:

1. To find approximately the time\* of *apparent* conjunction in right ascension, as affected by parallax;

$$u = F \cos \varphi \sin (H-\lambda)$$

$$u' = \mu' F \cos \varphi \cos (H-\lambda)$$

In hours,

$$(t) = \frac{u}{x' - u'}$$

Washington time of *apparent* conjunction, ( $T$ ) =  $\delta + (t)$

Local " " " " ( $T$ ) -  $\lambda$

The value of ( $T$ ) to the nearest tenth of an hour is sufficiently accurate. If a closer approximation is desired, the computation may be repeated, using  $h = H + (\mu)$  instead of  $H$ , ( $\mu$ ) being the sidereal equivalent of ( $t$ ),

$$x = (t) x' \quad (t') = -\frac{x-u}{x'-u'} \quad (T') = (T) + (t').$$

2. To find a nearer approach to the time of either phase, let us assume the Washington mean time  $T$ , which for the first computation may be the computed time of *apparent* conjunction, or some conjectural time near it; later if  $H-\lambda$  is west or +, earlier if  $H-\lambda$  is east or -. For this time find

$$t = T - \delta$$

$$h = H + \mu, \text{ or } h - \lambda = H - \lambda + \mu$$

$$x = t x'$$

$$y = Y + t y',$$

and then  $T_1$  and  $T_2$ , the approximate Washington mean times of immersion and emersion, by the following formulæ. The local mean times will be found by subtracting from  $T_1$  and  $T_2$  the longitude of the place.

$$A \sin B = E \sin \varphi$$

$$u = F \cos \varphi \sin (h-\lambda)$$

$$u' = \mu' A \cos B$$

$$A \cos B = F \cos \varphi \cos (h-\lambda)^\dagger$$

$$v = A \sin (B - \delta')$$

$$v' = \mu' u \sin \delta'$$

[or, with other auxiliaries than  $A$  and  $B$ ,

$$b = F \cos \varphi \cos (h-\lambda)$$

$$u' = b \mu'$$

$$v' = E \sin \varphi \cos \delta' - b \sin \delta']$$

$$m \sin M = x - u$$

$$n \sin N = x' - u'$$

$$m \cos M = y - v$$

$$n \cos N = y' - v'$$

Burckhardt.

$$k = .27227$$

$$\log k = 9.43500$$

$$\cos \psi = \frac{m \sin M - N}{k}$$

$$\psi < 180^\circ$$

\* It is convenient, but not necessary, to have this time.

† If ( $h-\lambda$ ) be restricted to values numerically less than  $12^h$ , or  $180^\circ$ ,  $B$  may be taken in the same quadrant with ( $h-\lambda$ ), and have the same sign as the latitude. For a place where many occultations are observed, tables of  $A$ ,  $B$ ,  $u$  and  $u'$  for different values of ( $h-\lambda$ ), or of  $E \sin \varphi \cos \delta'$  for different declinations, would be convenient.

	For Immersion.	For Emersion.
In hours,	$t_1 = -\frac{m \cos (M-N)}{n} - \frac{k \sin \phi}{n}$	$t_2 = -\frac{m \cos (M-N)}{n} + \frac{k \sin \phi}{n}$
Washington mean time,	$T_1 = T + t_1$	$T_2 = T + t_2$
Local " "	$T_1 - \lambda$	$T_2 - \lambda$

3. Assuming now  $T_1 = \delta + t + t_1$  for the immersion, or  $T_2 = \delta + t + t_2$  for the emersion, as the Washington time instead of  $T$ , and recomputing, we can obtain nearer approximation to the times of these phenomena. But the first operation will give the times usually within one or two minutes, which is sufficiently accurate for watching for an immersion. For an emersion a more accurate knowledge is desirable. But for this purpose it will often be sufficient to substitute  $(h_2 - \lambda) = (h - \lambda + \frac{1}{2} \mu_2)$  for  $(h - \lambda)$  in the computation of  $u'$  and  $v'$ , and, using the same  $m$  and  $M$  as before, recompute  $n$ ,  $N$ ,  $\phi$  and  $t_2$ , a new correction to be added to  $T$ .

If  $\log. m \sin (M-N) = 9.4350$  nearly, a recalculation will generally be necessary to determine whether, numerically,  $\cos \phi < 1$ , or  $\cos \phi > 1$ . In the latter case the impossible value of  $\cos \phi$  indicates that an occultation at the given place is impossible, unless the computed distance from the moon's limb is within the errors of the ephemeris of the moon and star.

In such cases of near approach to the moon's limb, we may take  $\phi = 0^\circ$ , or  $180^\circ$ , according as  $m \sin (M-N)$  is + or —; and for finding the time of nearest approach,

$$t = -\frac{m \cos (M-N)}{n}$$

The distance from the moon's limb is then

$$\pi [m \sin (M-N) - k],$$

disregarding the sign of  $m \sin (M-N)$ ; or, allowing for the augmentation of the semi-diameter,

$$\pi [m \sin (M-N) - k] [1 + z \sin \pi],$$

$$z = A \cos (B - \delta').$$

where

4. Having found satisfactorily the times of immersion and emersion, and therefore  $N$  and  $\phi$  in each case, we have as the angle from the *North point* of the moon's limb, positive towards the *West*,

$$Q = 90^\circ - N - \phi \quad \text{for an Immersion,}$$

$$Q = 90^\circ - N + \phi \quad \text{for an Emersion;}$$

and, taking

$$c \sin C = u + t u'$$

$$c \cos C = v + t v',$$

in which the last value of  $t$  for the particular phase is properly used, we have as the angle from the *Vertex* of the moon's limb, or that point which is nearest the zenith,

$$V = Q + C$$

also reckoned positive in the same direction as  $Q$ , i. e., towards the left.

For the image as seen through an inverting telescope, these angles should be increased by  $180^\circ$ .

5. As a check on the accuracy of the work, we have, using the last computed values of the several quantities,

$$[(x-u) + t(x'-u')]^2 + [(y-v) + t(y'-v')]^2 = k^2 = 0.07413;$$

Or, we may compute  $u$ ,  $v$ ,  $x$ , and  $y$ , with the last determined time of immersion, or of emersion, and we should have for either, as the condition of the phenomenon,

$$(x-u)^2 + (y-v)^2 = k^2 = 0.07413$$

or,  $\log m = \log k = 9.4350$

Greater values than these indicate that the computed time of an immersion is too early, of an emersion too late, by a quantity nearly proportional to the difference.

*Example.*—It is required to find the times of immersion and emersion of  $\alpha$  Arietis, January 2, 1879, at Cape Foulweather, Oregon, for which

$$\varphi = +44^{\circ} 48' \quad \lambda = +3^{\text{h}} 9^{\text{m}} 0$$

The data for the computation are given on page 415. We see in advance that  $\phi$  is between the limiting latitudes; that  $\phi - \lambda$ , the local time of *geocentric* conjunction, is about two hours after sunset; and that  $H - \lambda$  is less than an hour from the meridian.

The constants of the place are :

$$\begin{array}{lll} 1. \sin \phi = 9.8480 & 1. \cos \phi = 9.8510 & \log F \cos \phi = 9.8517 \\ \log E = 9.9978 & \log F = 0.0007 & \text{Constant, } \log \mu' = 9.4192 \\ (1) \log E \sin \phi = 9.8458 & (2) \log F \cos \phi = 9.8517 & (3) \log \mu' F \cos \phi = 9.2709 \end{array}$$

From page 415 we have, for the time of *geocentric* conjunction,

$$\begin{array}{llll} \text{Washington time, } \phi & = \text{Jan. 2, } 9^{\text{h}} 54.6 & Y = +.5341 & \phi' = +19^{\circ} 19.3 \\ \text{Local time, } \phi - \lambda & = \text{ " 2, } 6^{\text{h}} 45.6 & x' = .5213 & 1. \sin \phi' = 9.5197 \\ & H = +2^{\text{h}} 20.2 & y' = +.1730 & \\ & H - \lambda = -0^{\text{h}} 48.8 = -12^{\circ} 12'.0 & & \end{array}$$

1. For an approximation to the time of *apparent* conjunction, we have

$$\begin{array}{llll} (2) & \log F \cos \phi = 9.852 & (3) & \log \mu' F \cos \phi = 9.271 & x' = .521 \\ (4) & 1. \sin (H - \lambda) = 9.325 \pi & (5) & 1. \cos (H - \lambda) = 9.990 & u' = .182 \\ (6) = (2) + (4) & \log u = 9.177 \pi & (7) = (3) + (5) & \log u' = 9.261 & x' - u' = .339 \\ (8) & \log (x' - u') = 9.530 & & & \\ (6) - (8) & \log (t) = 9.647 \pi & & & \end{array}$$

$$\begin{array}{ll} \text{Washington mean time, } & (t) = -0.444 = -0^{\text{h}} 26.6 \\ & \phi = 9^{\text{h}} 54.6 \\ & (T) = \phi + (t) = \text{Jan. 2, } 9^{\text{h}} 28.0 \end{array}$$

2. Assuming this time, for which  $t = (t) = -0^{\text{h}} 26.6$ , we proceed as follows to find the times of immersion and emersion and the angles of position of the points of contact.

$$\begin{array}{llll} (9) & t = -0^{\text{h}} 26.6, & \mu = -0^{\text{h}} 26.7 & (27) & x' = +.5213 \\ (10) & H - \lambda = -0^{\text{h}} 48.8 & & (28) & u' = +.1766 \\ (9) + (10) & h - \lambda = -1^{\text{h}} 15.5 = -18^{\circ} 52'.5 & & (29) & y' = +.1730 \\ (11) & 1. \sin (h - \lambda) = 9.5099 \pi & & (30) & v' = -.0200 \\ (12) = (2) & \log F \cos \phi = 9.8517 & & (27) - (28) & x' - u' = \pi \sin N = +.3447 \\ (13) & 1. \cos (h - \lambda) = 9.9760 & & (29) - (30) & y' - v' = \pi \cos N = +.1930 \\ (14) & 1. \sin \phi' = 9.5197 & & (31) & \log m \sin M = 7.1761 \pi \\ (11) + (12) & \log u = 9.3616 \pi & \left. \begin{array}{l} 1. v' = 8.3005 \pi \\ 1. u' = 9.2469 \pi \end{array} \right\} & (32) & \log m \cos M = 8.2577 \\ (15) & \text{Constant, } \log \mu' = 9.4192 & & (33) & 1. \tan M = 8.9184 \pi \quad M = -2^{\circ} 45' \\ (16) = (12) + (13) & \log A \cos B = 9.8277 & & (34) & 1. \cos M = 9.9985 \\ (17) = (1) & \log A \sin B = 9.8458 & B = +46^{\circ} 12' & & \\ (17) - (16) & 1. \tan B = 0.0181 & \delta' = +19^{\circ} 19' & (35) & \log \pi \sin N = 9.5374 \\ (18) & 1. \sin B = 9.8584 & B - \delta' = +26^{\circ} 53' & (36) & \log \pi \cos N = 9.2856 \\ (19) = (17) - (18) & \log A = 9.9874 & & (37) & 1. \tan N = 0.2518 \quad N = +60^{\circ} 45' \\ (20) & 1. \sin (B - \delta) = 9.6553 & & (38) & 1. \sin N = 9.9408 \quad M - N = -65^{\circ} 30' \\ (19) + (20) & \log v = 9.6427 & & & \\ (21) & t x' = -0.444 \times .5213 = x = -.2314 & (39) = (32) - (34) & \log m = 8.2592 & (39) & \log m = 8.2592 \\ (22) & u = -.2299 & (40) & \text{Constant, } \log \frac{1}{k} = 0.5650 & (42) = (38) - (35) & \log \frac{1}{n} = 0.4034 \\ (23) & Y = +.5341 & (41) & 1. \sin (M - N) = 9.9590 \pi & (43) & 1. \cos (M - N) = 9.6177 \\ (24) & t y' = -0.444 \times .1730 = -.0768 & (39) + (40) + (41) & 1. \cos \phi = 8.7832 \pi & (44) & \log \frac{m}{n} \cos (M - N) = 8.2803 \\ (25) & y = +.4573 & & & & \\ (26) & v = +.4392 & (45) & \phi = 93^{\circ} 29' & (47) & 1. \sin \psi = 9.9992 \\ (21) - (22) & x - u = m \sin M = -.0015 & (46) & 90^{\circ} - N = 29^{\circ} 15' & (42) - (40) & \log \frac{k}{n} = 9.8384 \\ (25) - (26) & y - v = m \cos M = +.0181 & (46) - (45) & \text{at Im. } Q_1 = -64^{\circ} 14' & (48) & \log \frac{k}{n} \sin \psi = 9.8376 \\ & & & (46) + (45) & \text{at Em. } Q_2 = 122^{\circ} 44' & \\ & & & & (49) & -\frac{m}{n} \cos (M - N) = -0.019 \\ & & & & (50) & \frac{k}{n} \sin \psi = +0.638 \end{array}$$

## For Immersion.

## For Emersion.

(51)-(49)-(50)	$t_1 = -0.707 =$	$-0^{\text{h}} 42.4^{\text{m}}$	(52)-(49)+(50)	$t_2 = +0.669 =$	$+0^{\text{h}} 40.1^{\text{m}}$
	$T =$	Jan. 2, 9 28.0		$T =$	Jan. 2, 9 28.0
Washington mean time, $T_1 = T + t_1 =$	" 2,	8 45.6		$T_2 = T + t_2 =$	" 2, 10 8.1
	$\lambda =$	3 9.0		$\lambda =$	3 9.0
Local mean time, $T_1 - \lambda =$	" 2,	5 36.6		$T_2 - \lambda =$	" 2, 6 59.1
(51)-(49)-(50)	$t_1 = -0.707$		(52)-(49)+(50)	$t_2 = +0.669$	
(51)×(28)	$-0.707 \times .177 =$	$t_1 u' = -.125$	(52)×(28)	$0.669 \times .177 =$	$t_2 u' = +.116$
(22)		$u = -.230$	(22)		$u = -.230$
$u + t_1 u' =$	$c_1 \sin C_1 =$	.355	$u + t_2 u' =$	$c_2 \sin C_2 =$	.114
(51)×(30)	$-0.707 \times -.020 =$	$t_1 v' = +.014$	(52)×(30)	$0.669 \times -.020 =$	$t_2 v' = -.013$
(26)		$v = +.439$	(26)		$v = +.439$
$v + t_1 v' =$	$c_1 \cos C_1 =$	.453	$v + t_2 v' =$	$c_2 \cos C_2 =$	.426
	$\log c_1 \sin C_1 =$	9.550 $\pi$		$\log c_2 \sin C_2 =$	9.057 $\pi$
	$\log c_1 \cos C_1 =$	9.656		$\log c_2 \cos C_2 =$	9.629
	$\text{l. tan } C_1 =$	9.894 $\pi$		$\text{l. tan } C_2 =$	9.428 $\pi$
	$C_1 =$	$38^{\circ} 1'$		$C_2 =$	$15^{\circ} 0'$
Angle from North Point, $Q_1 =$		64.2		$Q_2 =$	122.7
Angle from Vertex, $Q_1 + C_1 = V_1 =$		102.3		$Q_2 + C_2 = V_2 =$	107.7

We have also as a Check,

$$[(x-u) + t(x'-u')]^2 + [(y-v) + t(y'-v')]^2 = .0741 \quad .0741$$

(3.) Assuming now  $T_1$  for the emersion, and  $T_2$  for the immersion, as corrected values of the Washington time,  $T$ , we can obtain a nearer approximation. Instead, however, of an entire recomputation, a partial revision may be made, like the following, for correcting the computed time and the angles of position for the emersion, using the values of  $M$ ,  $\log m$ ,  $t_2$ , and  $C_2$ , from the preceding computation.

(9)	$\frac{1}{2} t_2 = 20.0$	$\frac{1}{2} \mu = +0^{\text{h}} 20.1$	(27)	$x' = .5213$
(10)	$h - \lambda = -1^{\circ} 15.5$		(28)	$u' = +.1811$
(9)×(10)	$h_2 - \lambda = -0^{\circ} 55.4 = -13^{\circ} 51'.0$		(29)	$y' = +.1730$
			(30)	$v' = -.0148$
(11)	$\text{l. sin } (h_2 - \lambda) = 9.3791 \pi$		(27)-(28)	$\pi \sin N = +.3402$
(12)=(2)	$\log F \cos \phi = 9.8517$		(29)-(30)	$\pi \cos N = +.1878$
(13)	$\text{l. cos } (h_2 - \lambda) = 9.9872$			
(14)	$\text{l. sin } \delta' = 9.5197$		(35)	$\log \pi \sin N = 9.5318$
(11)×(12)	$\log u = 9.2308 \pi$	$\text{l. } v' = 8.1697 \pi$	(36)	$\log \pi \cos N = 9.2737$
(15) <i>Constant,</i>	$\log \mu' = 9.4192$		(37)	$\text{l. tan } N = 0.2581$
(16)=(12)×(13)	$\log A \cos B = 9.8389$	$\text{l. } u' = 9.2581$	(38)	$\text{l. sin } N = 9.9422$
(39)	$\log m = 8.2592$	(39)	$\log m = 8.2592$	(52)=(49)×(50)
(40) <i>Constant,</i>	$\log \frac{1}{k} = 0.5650$	(42)=(38)-(35)	$\log \frac{1}{n} = 0.4104$	$t_2 = +.6801$
(41)	$\text{l. sin } (M - N) = 9.9602 \pi$	(43)	$\text{l. cos } (M - N) = 9.6119$	(53)
(39)×(40)×(41)	$\text{l. cos } \psi = 8.7844 \pi$	(44)	$\log \frac{m}{n} \cos (M - N) = 8.2815$	$t_2 \pi \sin N = +.2315$
(45)	$\psi = 93^{\circ} 29'$	(47)	$\text{l. sin } \psi = 9.9992$	(27)
(46)	$90^{\circ} - N = 28^{\circ} 54'$	(42)-(40)	$\log \frac{k}{n} = 9.8454$	$\pi \sin M = -.0015$
				(54)=(27)×(53)
<i>Angle from North Point,</i>				$= .2300$
(46)×(45)	$Q_2 = +122.4^{\circ}$	(48)	$\log \frac{k}{n} \sin \psi = 9.8446$	(55)
	$C_2 = -14.7$			$t_2 \pi \cos N = +.1277$
				(28)
				$\pi \cos M = +.0181$
				(56)=(28)×(55)
				$= .1458$
				[54] <sup>s</sup> = .0529
				[56] <sup>s</sup> = .0212

*Jupiter's Satellites*, pages 452–473. These pages contain for the several Satellites—

1. The Washington mean times of the occultations, eclipses, transits and transits of shadows, arranged in the order of time. Those visible at Washington, or which occur when the sun is more than  $8^\circ$  below and Jupiter more than  $8^\circ$  above the horizon of that place, are indicated by a \*.

2. A diagram for each month, constructed for the eclipse which occurs nearest the middle of the month, showing the phases of the eclipse for an inverting telescope. The stars indicate the points of disappearance and reappearance, distinguished by  $d$  and  $r$ . The space between them shows the position of the shadow of the planet.

3. Washington mean times of geocentric superior conjunctions, arranged for each satellite separately.

4. The rectangular coördinates  $x'$  and  $y'$ , for successive times reckoned from the next preceding superior conjunction, computed for a constant major axis and maximum minor axis of the apparent ellipse described by the satellite as seen from the sun at its mean distance from the planet.

5. The *factors* by which  $x'$  and  $y'$  are to be multiplied to obtain the actual coördinates  $x$  and  $y$  for the apparent ellipse, as seen from the earth at any date; the inclination  $p$  of the minor axis to the circle of declination, reckoned from the *north*, positive towards the *east*; and the actual coördinates  $x$  and  $y$  at the times of eclipse of each satellite.

The coördinates are referred to the centre of the primary and to the major and minor axes of the ellipse described by the satellite, and are expressed in seconds of arc.  $x$  is positive when on the *east* side of the planet;  $y$  is positive when *north*. By means of them the configurations of the satellite can be found at any time.

The *Elements of Saturn's Ring*, page 474, give the *apparent* magnitude and position of its several components for each 20 days. The *apparent Discs of Venus and Mars* are given on the same page for each 30 days.

The *Phenomena*, pages 475 and 476, include the times of conjunction, opposition and quadrature, perihelion and aphelion, stationary points, and conjunction with the moon in right ascension, of the principal planets.

The *Positions of the Principal Observatories* are given on pages 477 and 478. The authorities for these positions, and the longitudes with reference to the meridians upon which they actually depend, will be found in the American Ephemeris for 1870, 1871 and 1872.

# **APPENDIX.**



## CONSTRUCTION\* OF THE ASTRONOMICAL AND NAUTICAL EPHEMERIDES FOR 1879.

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THE Precession of the Equinoxes, the Mean Obliquity of the Ecliptic, and the Constant of Aberration (p. 248) are taken from STRUVE and PETERS. They are:

$$\text{Precession}^* = 50''.2411 + 0''.0002268 t,$$

$$\text{Obliquity}^\dagger = 23^\circ 27' 54''.22 - 0''.4645 t - 0''.0000014 t^2,$$

$$\text{Aberration}^\ddagger = 20''.4451 \pm 0''.0111,$$

in which  $t$  is the number of years after 1800.

The Nutation of the Apparent Obliquity and the Equation of the Equinoxes are computed from PETERS' formulæ given in his *Numerus Constans Nutationis*, pp. 46–48, and reprinted in the volume of this Ephemeris for 1855. These quantities have been used in all computations relating to the Fixed Stars.

In the Ephemerides of the Sun, Moon, and Planets, the Obliquity of the Ecliptic and the Nutation of HANSEN and OLUFSEN's *Tables du Soleil* have been used; but the same Constant of Aberration as for the fixed stars. The Mean Obliquity exceeds that of PETERS by  $0''.32$ .

The General Constants for Star Reduction are adapted to the formulæ given on page 258. They are computed from the *Tables to facilitate the Reduction of Places of the Fixed Stars, prepared for the use of the American Ephemeris and Nautical Almanac*, Washington, 1869, which have been used in the preparation of previous volumes of this work subsequent to that of 1861.

The Mean Places of the 198 Standard Stars have also been taken from the same tables. Dr. GOULD's *Standard Places of Fundamental Stars*, U. S. Coast Survey, Washington, 1866, is the authority given for 48 Northern Circumpolar Stars and 128 Time Stars; the *British Nautical Almanac* for 1848 for 13 Stars south of  $-40^\circ$  declination; and WOLFER's *Tabulæ Reductionum Observationum Astronomicarum*, Berlin, 1858, for Sirius, Castor, (the mean of the components,) Procyon,  $\gamma$  Draconis, and  $\alpha$  Cephei. The magnitudes, except of the 13 Southern Stars, are ARGELANDER's.

The reductions from the mean to the apparent places of the Stars contained in WOLFER's *Tabulæ Reductionum*, except  $\alpha$  and  $\delta$  Ursæ Minoris, have been derived from that work; the reductions of the rest from the *Tables of the American Ephemeris*. These reductions include the terms of the formulæ on pages 258 and 487, so far as sensible, except those depending on the moon's longitude. These terms, however, have been applied to the four stars whose places are given for every day. Their values for other stars may readily be found by Tables VI. and VII. of this Appendix.

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\* PETERS' *Numerus Constans Nutationis*, p. 71.

† Ibid., pp. 66 and 71.

‡ STRUVE'S *Constant de l'Aberration*, p. 47.



## APPENDIX.

To the position of Sirius, as derived from WOLFEES, (the correction of the "*Tabula Subsidiaria*" being omitted), have been applied the terms given by AUWERS,\*

$$q = +0''.0647 - 0''.000718 (t - 1860) + 0''.1510 \cos (u + 1^\circ 6')$$

$$r = -0''.630 - 0''.00044 (t - 1860) + 1''.445 \sin (u + 23^\circ 30')$$

in which  $u$ , the eccentric anomaly from the inferior apsis, is found by the formula

$$u - e \sin u = n (t - T),$$

from the elements

$$T = 1793.830, \text{ passage through the inferior apsis,}$$

$$e = 0.6010, \text{ the eccentricity,}$$

$$n = 7^\circ.28475, \text{ mean annual motion in orbit,}$$

$$49^\circ.418, \text{ period of revolution.}$$

The Mean Places of such of the Moon-culminating Stars as are not found in the list of standard stars, have been taken in order of preference from a revised Catalogue in course of preparation, the *Almanac Catalogue of Zodiacal Stars printed for the use of the American Ephemeris and Nautical Almanac, Washington, 1864; the Greenwich Twelve-Year Catalogue; and the Catalogue of the British Association.*

The Ephemeris of the Sun† is constructed from HANSEN and OLUFSEN's *Tables du Soleil*, Copenhagen, 1853, except that Struve's Aberration has been used. This is equivalent to adding  $0''.19$  to the longitudes, but does not affect the right ascensions and declinations. The Sun's rectangular equatorial coördinates have been computed from the longitudes and latitudes by the following formulæ:

$$X = R \cos \lambda$$

$$Y = R \sin \lambda \cos \omega - 19.3 R \beta$$

$$Z = R \sin \lambda \sin \omega + 44.5 R \beta$$

$$X' = X + Y \sec \omega \Delta \lambda$$

$$Y' = Y - X \cos \omega \Delta \lambda + Z \Delta \omega - 9.4 \tau R \sin (\odot + 187^\circ)$$

$$Z' = Z - X \sin \omega \Delta \lambda - Y \Delta \omega + 21.7 \tau R \sin (\odot + 187^\circ)$$

in which  $\lambda$ ,  $\beta$  and  $\omega$  are referred to the equinox and ecliptic of the date;  $\Delta \lambda$  is the reduction of longitude for precession and nutation from Jan. 0;  $\Delta \omega$  the reduction of the mean to the apparent obliquity;  $\tau$  the part of the year since Jan. 0; and the numerical coefficients are in units of the 7th place of decimals.

The mean equatorial Horizontal Parallax of the Sun, adopted from Prof. NEWCOMB'S *Investigation of the Distance of the Sun and the Elements which depend on it*,‡ is  $8''.848$ . The adopted Semidiameter of the Sun at the Earth's mean distance is  $16' 2''$ .

The Ephemeris of the Moon is constructed from PEIRCE'S *Tables of the Moon, 2d edition*, Washington, 1865. They include the *Tables of the Moon's Parallax* constructed from WALKER'S and ADAMS'S formulæ.

The Semidiameter of the Moon is computed from the Moon's Horizontal Parallax by the formula,

$$S = .272274 \pi + 2''.5.$$

A semidiameter  $2''.5$  less is found to be better adapted for the computation of eclipses and occultations.

The Ephemeris of Mercury is derived from Prof. WINLOCK'S *Tables of Mercury*, Washington, 1864. They are based on the theory of LE VERRIER, published in the *Additions to the Connaissance des Temps* for 1848.

\* *Astronomische Nachrichten*, No. 1506.

† From CARLINI'S *Tables* before 1858.

‡ *Astronomical Observations made at the U. S. Naval Observatory, Washington, 1865, Appendix II.*

## CONSTRUCTION OF THE ALMANAC.

The Ephemeris of Venus is derived from Mr. G. W. HILL's *Tables of Venus*, Washington, 1872.

The Ephemeris of Mars is derived from manuscript Tables constructed from LINDENAU's Tables. Mr. HUGH BREEN's results, contained in his paper *On the Corrections of LINDENAU's Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX., have also been discussed and applied; and LE VERRIER's secular variations of the elements are likewise adopted. The following are the corresponding corrected elements, and annual variations for Washington, 1855.0:

$$\begin{aligned} L &= 320^{\circ} 13' 33.87'' + 689101''.1527 t. \\ \pi &= 333^{\circ} 23' 17.84'' + 65''.9990 t. \\ \Omega &= 48^{\circ} 25' 55.29'' + 27''.6997 t. \\ i &= 1^{\circ} 51' 2.20'' - 0''.02141 t. \\ e &= 19238''.75 + 0''.18549 t. \\ n &= 689050''.8927 \\ a &= 1.5236915 \end{aligned}$$

The Ephemeris of Jupiter is derived from manuscript Tables constructed from BOUVARD's Tables, with such changes as were required to make them correspond more nearly to the formulæ.

The Ephemeris of Saturn is derived from BOUVARD's Tables. The perturbations produced by Jupiter, and the change of the Great Inequality since 1840, have been increased by  $\frac{1}{8}$  of their value. ADAMS's Table, in the *British Nautical Almanac* for 1851, has been substituted for BOUVARD's Table XLII. The following corrections of the elements for 1855.0 have also been introduced:

$$\begin{aligned} \text{corr. mean long.} &= + 4''.9 \\ \text{corr. long. of node} &= - 143''.0 \\ \text{corr. inclination} &= - 5''.7 + 0''.0149 t. \end{aligned}$$

The Ephemeris of Uranus is derived from Prof. NEWCOMB's *Tables of Uranus*, Washington, 1873.

The Ephemeris of Neptune is derived from Prof. NEWCOMB's *Tables of Neptune*, Washington, 1866.

The eclipses and elongations of Jupiter's Satellites are computed from DAMOISEAU's Tables.

The semidiameters of the Planets are computed from the following values:

	Semidiameter.	Log Dist.	Authority.
Mercury	3.34	0.00	LE VERRIER, <i>Theory of Mercury</i> .
Venus	$8.546 \pm 0.086$	0.00	PEIRCE, from the Washington Observations of 1845 and 1846, made with the mural circle.
Mars (polar)	$2.842 \pm 0.057$	0.25	
Jupiter (polar)	$18.78 \pm 0.067$	0.70	
Saturn (polar)	$8.77 \pm 0.039$	0.95	
Uranus	$1.68 \pm 0.3$	1.30	
Jupiter (equat.)	20.00	0.70	
Saturn (equat.)	9.38	0.95	

The apparent elements of Saturn's Rings are computed from BESSEL's data, except those for Bond's dusky ring.

The Tables for the eclipses of the sun are adapted to the modification of BESSEL's formulæ, suggested by T. HENRY SAFFORD, jr. The formulæ are given in PEIRCE's *Spherical Astronomy* and CHAUVENET's *Spherical and Practical Astronomy*, Vol. I.

## APPENDIX.

The elements for occultations of stars by the moon are adapted to BESSEL's method in the *Astronomische Nachrichten*, Vol. VII., and the *Berliner Astronomisches Jahrbuch* for 1831. The formulæ are also to be found in CHAUVENET's *Astronomy*.

The intervals of original computation have in all cases been made sufficiently small to authorize the use of the differences as a check of the accuracy of the work. The results have also been tested, in various portions, by means of duplicate computations. The proofs from the stereotype plates have been thoroughly examined by an independent series of differences. And it is believed that, in every respect, that system has been adopted in which accuracy was most likely to be secured.

The principal computations of the Ephemeris have been distributed in the following manner :

The Sun has been computed by Mr. EASTWOOD; the Moon's longitude, latitude, semi-diameter and horizontal parallax, by Prof. KEITH; right ascension and declination, by Prof. VAN VLECK; and culminations, by Prof. RUNKLE; the lunar distances, by Mr. W. B. OLIVER; Mercury and Venus, by Mr. AUSTIN; Mars and Uranus, by Mr. FERREL; Jupiter and Jupiter's Satellites, by Prof. KENDALL; Saturn, by Mr. G. W. HILL; and Neptune, by Mr. WIESSNER; the fixed stars have been prepared by Mr. WIESSNER, Mr. LOOMIS, Mr. FERREL, and Mr. EASTWOOD; the general constants for their reduction, by Mr. FERREL; and the occultations, by Mr. DOWNES assisted by Mr. WIESSNER; the eclipses have been computed and the charts projected by Mr. HILL; the positions of observatories was compiled by Dr. B. A. GOULD, and revised by him for the volume of 1870.

# TABLE I.

TABLE SHOWING THE CORRECTION REQUIRED, ON ACCOUNT OF SECOND DIFFERENCES OF THE MOON'S MOTION, IN FINDING THE GREENWICH TIME CORRESPONDING TO A CORRECTED LUNAR DISTANCE.

Approximate Interval.				Difference of the Proportional Logarithms in the Ephemeris.																											
				2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52		
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
0	10	2	50	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3			
0	20	2	40	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	6	6	6			
0	30	2	30	0	1	1	2	2	2	2	3	3	3	3	4	4	5	5	5	6	6	7	7	7	8	8	9	9			
0	40	2	20	0	1	1	2	2	3	3	3	4	4	5	5	6	6	6	7	7	8	8	9	9	10	10	11	11			
0	50	2	10	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13			
1	0	2	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	14	14			
1	10	1	50	1	1	2	3	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	12	13	14	15	15	16			
1	20	1	40	1	1	2	3	4	4	5	6	7	7	8	9	9	10	10	11	12	12	13	14	15	16	16	17	17			
1	30	1	30	1	1	2	3	4	4	5	6	7	8	8	9	9	10	11	11	12	12	13	14	15	16	17	18	18			
				Difference of the Proportional Logarithms in the Ephemeris.																											
				54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102			
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s				
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
0	10	2	50	4	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	6	6	7	7	7				
0	20	2	40	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	11	11	11	11	12	12	12	13	13				
0	30	2	30	9	10	10	10	11	11	12	12	12	13	13	13	14	14	14	15	15	16	16	16	17	17	17	18				
0	40	2	20	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	19	20	20	21	21	22	22				
0	50	2	10	14	14	15	15	16	16	16	17	17	18	19	19	20	20	21	21	22	22	23	23	24	24	25	26				
1	0	2	0	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	26	27	27	28				
1	10	1	50	16	17	17	18	18	19	19	20	21	21	22	22	23	24	24	25	25	26	27	27	28	29	30	30				
1	20	1	40	17	17	18	19	19	20	20	21	21	22	23	23	24	25	25	26	27	28	28	29	30	31	31	32				
1	30	1	30	17	18	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29	30	31	31	32	32				
				Difference of the Proportional Logarithms in the Ephemeris.																											
				104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138										
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s					
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
0	10	2	50	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9					
0	20	2	40	13	13	13	14	14	14	14	15	15	15	15	15	15	16	16	16	16	16	17	17	17	17	17					
0	30	2	30	18	18	19	19	19	20	20	20	21	21	21	22	22	22	22	23	23	23	24	24	24	24	24					
0	40	2	20	22	23	23	24	24	25	25	25	26	26	27	27	28	28	28	29	29	29	30	30	30	30	30					
0	50	2	10	26	26	27	27	28	29	29	29	30	30	31	31	32	32	33	33	33	34	34	34	34	34	34					
1	0	2	0	29	29	30	30	31	31	32	33	33	34	34	35	35	36	37	37	38	38	38	38	38	38	38					
1	10	1	50	31	31	32	32	33	34	34	35	35	36	37	37	38	38	39	40	40	41	41	41	41	41	41					
1	20	1	40	32	33	33	34	34	35	35	36	37	38	38	39	39	40	40	41	41	42	42	42	42	42	42					
1	30	1	30	32	33	34	34	35	35	36	36	37	38	39	39	40	40	41	42	42	43	43	43	43	43	43					

The Correction is to be *added* to the approximate Greenwich Time when the Proportional Logarithms in the Ephemeris are *decreasing*, and *subtracted* when they are *increasing*.

# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.										
Sidereal.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s s	
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807		
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1	0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2	.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3	.008
4	0 0.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4	.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5	.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6	.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7	.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8	.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9	.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10	.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11	.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12	.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13	.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14	.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15	.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16	.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17	.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18	.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19	.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20	.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21	.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22	.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23	.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24	.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25	.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26	.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27	.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28	.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29	.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30	.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31	.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32	.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33	.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34	.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35	.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36	.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.869	37	.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.033	38	.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39	.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40	.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41	.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42	.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43	.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44	.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45	.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46	.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47	.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48	.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49	.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50	.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51	.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52	.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53	.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54	.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55	.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56	.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57	.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58	.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59	.161

# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Sidereal	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443	1 0.003
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	2 .005
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	3 .008
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	4 .011
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	5 .014
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	6 .016
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	7 .019
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	8 .022
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.924	2 28.754	9 .025
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	10 .027
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	11 .030
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	12 .033
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	13 .035
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	14 .038
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	15 .041
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	16 .044
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	17 .046
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	18 .049
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	19 .052
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	20 .055
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	21 .057
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	22 .060
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	23 .063
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	24 .066
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	25 .068
25	1 22.732	1 32.562	1 42.391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	26 .071
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	27 .074
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	28 .076
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	29 .079
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	30 .082
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	31 .085
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	32 .087
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	33 .090
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	34 .093
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	35 .096
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	36 .098
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	37 .101
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	38 .104
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	39 .106
39	1 25.026	1 34.855	1 44.685	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	40 .109
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	41 .112
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	42 .115
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	43 .117
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	44 .120
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	45 .123
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	46 .126
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	47 .128
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	48 .131
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	49 .134
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	50 .137
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	51 .139
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	52 .142
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	53 .145
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	54 .147
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	55 .150
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	56 .153
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	57 .156
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	58 .158
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	59 0.161
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	

# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.									
Side- real.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1 0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.749	3 36.578	3 46.407	2 .005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3 .008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4 .011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5 .014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6 .016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7 .019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8 .022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9 .025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10 .027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11 .030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12 .033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13 .035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14 .038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15 .041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16 .044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17 .046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18 .049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19 .052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20 .055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21 .057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22 .060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23 .063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24 .066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25 .068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26 .071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27 .074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28 .076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29 .079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30 .082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31 .085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32 .087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33 .090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34 .093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35 .096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36 .098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37 .101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38 .104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39 .106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40 .109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41 .112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42 .115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43 .117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44 .120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45 .123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46 .126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47 .128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48 .131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49 .134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50 .137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51 .139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52 .142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53 .145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54 .147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55 .150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56 .153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57 .156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58 .158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59 .161

# TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.										
Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995		
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1	0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2	.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3	.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4	.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5	.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6	.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7	.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8	.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9	.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10	.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11	.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12	.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13	.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14	.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15	.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16	.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17	.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18	.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19	.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20	.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21	.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22	.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23	.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24	.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25	.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26	.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27	.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28	.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29	.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30	.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31	.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32	.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33	.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34	.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35	.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36	.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37	.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38	.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39	.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40	.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41	.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42	.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43	.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44	.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45	.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46	.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47	.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48	.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.189	1 17.045	49	.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50	.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51	.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52	.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53	.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54	.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55	.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56	.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57	.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58	.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59	0.162



# TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 8.134	2 17.991	2 27.847	
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 8.298	2 18.155	2 28.011	1 0.003
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.463	2 18.319	2 28.176	2 .005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3 .008
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4 .011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5 .014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6 .016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7 .019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8 .022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9 .025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10 .027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11 .030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12 .033
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13 .036
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14 .038
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15 .041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16 .044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17 .047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18 .049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19 .052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20 .055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21 .057
22	1 22.466	1 32.222	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22 .060
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23 .063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24 .066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25 .068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26 .071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27 .074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28 .077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29 .079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30 .082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31 .085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32 .088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33 .090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34 .093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35 .096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36 .099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37 .101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38 .104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39 .107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40 .110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41 .112
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42 .115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43 .118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44 .120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45 .123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46 .126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47 .129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48 .131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49 .134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50 .137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51 .140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52 .142
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53 .145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54 .148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.882	55 .151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56 .153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57 .156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58 .159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59 0.162

# TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar	16 <sup>h</sup>	17 <sup>h</sup>	18 <sup>h</sup>	19 <sup>h</sup>	20 <sup>h</sup>	21 <sup>h</sup>	22 <sup>h</sup>	23 <sup>h</sup>	Per Seconds.
m	m	m	m	m	m	m	m	m	s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1 0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2 .005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3 .008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4 .011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5 .014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6 .016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7 .019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8 .022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9 .025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10 .027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11 .030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12 .033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13 .036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14 .038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15 .041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16 .044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17 .047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18 .049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19 .052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20 .055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21 .057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22 .060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23 .063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24 .066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25 .068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26 .071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27 .074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28 .077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29 .079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30 .082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31 .085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32 .088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33 .090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34 .093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35 .096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36 .099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37 .101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38 .104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39 .107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40 .110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41 .112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42 .115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43 .118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44 .120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45 .123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46 .126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47 .129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48 .131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49 .134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50 .137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51 .140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52 .142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53 .145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54 .148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55 .151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56 .153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57 .156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58 .159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59 0.162

TABLE IV.

TABLE GIVING THE CORRECTIONS OF  $A$  AND  $B$  WHICH DEPEND ON THE ARGUMENTS  $2\zeta$ , AND  $\zeta - \Gamma'$ .In units of the *fifth* decimal for  $A$ , and of the *fourth* for  $B$ .

Arg. ( $2\zeta$ )	$A\zeta$	$B\zeta$	Arg. ( $2\zeta$ )	$A\zeta$	$B\zeta$	Arg. ( $2\zeta$ )	$A\zeta$	$B\zeta$	Arg. ( $\zeta - \Gamma'$ )	$A'\zeta$
<sup>d</sup> 0.0	— 0	—886	<sup>d</sup> 4.6	—347	+459	<sup>d</sup> 9.2	+359	+410	<sup>d</sup> 0	+ 0
0.1	19	885	4.7	337	493	9.3	367	374	1	30
0.2	37	882	4.8	326	526	9.4	374	335	2	59
0.3	55	877	4.9	314	558	9.5	381	298	3	85
0.4	74	870	5.0	302	589	9.6	387	259	4	106
0.5	92	862	5.1	289	619	9.7	392	221	5	122
0.6	111	852	5.2	277	648	9.8	396	180	6	132
0.7	128	841	5.3	263	675	9.9	400	140	7	135
0.8	145	827	5.4	248	701	10.0	403	101	8	130
0.9	163	811	5.5	232	725	10.1	404	59	9	119
1.0	180	793	5.6	217	748	10.2	405	+ 19	10	102
1.1	196	775	5.7	201	769	10.3	405	— 22	11	80
1.2	212	754	5.8	185	788	10.4	404	62	12	53
1.3	228	732	5.9	168	806	10.5	402	103	13	+ 23
1.4	243	707	6.0	151	822	10.6	400	143	14	— 7
1.5	258	682	6.1	133	837	10.7	396	183	15	37
1.6	272	657	6.2	116	849	10.8	392	224	16	66
1.7	285	628	6.3	98	859	10.9	387	263	17	90
1.8	298	598	6.4	79	868	11.0	380	301	18	110
1.9	310	569	6.5	61	875	11.1	374	338	19	125
2.0	322	537	6.6	42	881	11.2	367	376	20	134
2.1	333	503	6.7	24	884	11.3	359	412	21	134
2.2	344	470	6.8	— 6	886	11.4	350	449	22	129
2.3	353	435	6.9	+ 13	885	11.5	340	483	23	116
2.4	362	399	7.0	32	883	11.6	329	516	24	97
2.5	370	362	7.1	49	879	11.7	317	549	25	74
2.6	376	324	7.2	68	873	11.8	306	581	26	47
2.7	383	285	7.3	86	865	11.9	293	610	27	— 17
2.8	389	247	7.4	105	855	12.0	281	640	28	+ 13
2.9	394	209	7.5	123	844	12.1	267	667	29	+ 43
3.0	398	169	7.6	140	831	12.2	252	693	Multiples of the Period of ( $2\zeta$ )	
3.1	401	129	7.7	158	815	12.3	237	717		
3.2	403	88	7.8	175	799	12.4	221	741		
3.3	404	46	7.9	191	781	12.5	206	762		
3.4	405	— 6	8.0	207	761	12.6	190	782	1	<sup>d</sup> 13.661
3.5	405	+ 35	8.1	223	738	12.7	174	800	2	27.322
3.6	404	76	8.2	239	715	12.8	156	817	3	40.982
3.7	402	116	8.3	254	691	12.9	138	833	Multiples of the Period of ( $\zeta - \Gamma'$ )	
3.8	399	155	8.4	268	665	13.0	121	845		
3.9	395	196	8.5	282	637	13.1	104	856		
4.0	390	235	8.6	294	607	13.2	85	866		
4.1	385	274	8.7	306	578	13.3	67	873	1	<sup>d</sup> 27.55
4.2	378	312	8.8	319	546	13.4	48	879	2	55.11
4.3	372	350	8.9	330	514	13.5	30	883		
4.4	364	388	9.0	341	480	13.6	+ 11	885		
4.5	—356	+424	9.1	+350	+446	13.7	— 7	—885		

ARGUMENTS. WASHINGTON MEAN NOON.						
1879.	Arg. ( $2\zeta$ )	Arg. ( $\zeta - \Gamma'$ )	1879.	Arg. ( $2\zeta$ )	Arg. ( $\zeta - \Gamma'$ )	REMARKS.
Jan. 0	<sup>d</sup> 0.781	<sup>d</sup> 13.04	Aug. 0	<sup>d</sup> 7.869	<sup>d</sup> 4.60	To the argument for the beginning of any month, add the day of the month and Washington mean time, and subtract the largest contained multiple of the period.
Feb. 0	4.459	16.49	Sept. 0	11.548	8.05	
March 0	5.138	16.93	Oct. 0	0.565	10.49	
April 0	8.816	20.38	Nov. 0	4.244	13.94	
May 0	11.495	22.82	Dec. 0	6.922	16.39	
June 0	1.513	26.27	1880.			
July 0	4.191	1.16	Jan. 0	10.601	19.83	

# TABLE V.

TABLE GIVING THE CORRECTIONS OF  $A$  AND  $B$  DEPENDING ON THE SMALL TERMS OF THE NUTATION.

Washington Mean Midnight.

1879.	$\Delta A.$	$\Delta B.$	1879.	$\Delta A.$	$\Delta B.$	1879.	$\Delta A.$	$\Delta B.$	
Jan. 0	-.00005	+0.0019	May 5	+0.0032	-0.0038	Sept. 2	+0.0007	+0.0077	
5	6	26	10	32	47	7	11	69	
10	6	34	15	31	56	12	15	58	
15	6	39	20	29	63	17	19	42	
20	6	43	25	25	68	22	22	24	
25	6	45	30	21	72	27	25	+	5
30	7	46	June 4	16	73	Oct. 2	26	-	14
Feb. 4	7	47	9	11	71	7	26		32
9	7	47	14	+	6	12	24		49
14	7	47	19		0	17	21		64
19	6	47	24	-	5	22	17		77
24	5	46	29		10	27	13		86
March 1	3	46	July 4	14	29	Nov. 1	8		92
6	-	44	9	17	14	6	+	4	94
11	+	41	14	20	+	2	11	-	92
16	3	38	19	22	19	16	5		88
21	6	34	24	23	35	21	9		80
26	10	29	29	23	51	26	13		69
31	13	24	Aug. 3	21	65	Dec. 1	15		57
April 5	17	18	8	18	75	6	16		43
10	20	10	13	14	81	11	16		29
15	23	+	18	9	85	16	16	-	13
20	26	-	23	-	86	21	15		0
25	29	18	28	+0.0002	+0.0083	26	13	+	12
30	+0.0031	-0.0028				31	-0.0008	+0.0022	

$$\begin{aligned} \Delta A = & +0.0025 \sin (2 \odot - \Omega) + 0.0009 \sin (2 \Gamma' - \Omega) \\ & + 0.0010 \sin 2 (\odot - \Gamma') + 0.0005 \cos \Gamma' \\ & - 0.0005 \sin 2 (\odot - \Omega) + 0.0004 \sin 2 \Gamma' \\ & - 0.0011 \sin (3 \odot - \Gamma) \\ \Delta B = & +0.0067 \cos (2 \odot - \Omega) \\ & - 0.0027 \cos (3 \odot - \Gamma) \\ & + 0.0024 \cos (2 \Gamma' - \Omega) \\ & - 0.0023 \sin \Gamma' \\ & + 0.0008 \cos 2 \Gamma' \end{aligned}$$

These terms are included in Log. A and Log B, f, G, and Log. g, pages 249-257.

# TABLE VI.

TABLES FOR FINDING THE REDUCTIONS FROM MEAN TO APPARENT  
RIGHT ASCENSIONS WHICH DEPEND ON  $2\zeta$  AND  $\zeta - \Gamma'$ .

Hor. Arg. = Star's Right Ascension.

Arg. (2 ( )	Δ a	Δ''a.														Arg. (2 ( )
		0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h		
0.0	-0.000	-0.0059	-57	-51	-42	-29	-15	-00	+15	+29	+42	+51	+57	+59	0.0	
0.5	03	57	59	56	50	39	26	12	+03	18	32	44	52	57	0.5	
1.0	05	53	58	58	54	47	37	24	-10	+05	20	34	45	53	1.0	
1.5	08	45	53	57	57	53	45	35	22	-07	+07	22	35	45	1.5	
2.0	10	36	46	52	55	55	51	43	32	19	-06	+09	23	36	2.0	
2.5	11	24	36	45	52	54	54	49	42	31	18	-04	+11	24	2.5	
3.0	12	11	25	36	45	51	54	53	49	40	30	17	-03	+11	3.0	
3.5	12	02	-12	25	37	46	51	54	52	48	39	29	16	-02	3.5	
4.0	12	15	+02	-13	26	37	46	52	54	53	48	39	29	15	4.0	
4.5	11	28	15	00	14	27	39	48	53	55	53	48	40	28	4.5	
5.0	09	39	27	+14	-01	15	29	40	49	55	56	54	48	39	5.0	
5.5	07	48	39	26	+12	-02	18	31	42	51	56	57	55	48	5.5	
6.0	05	54	48	37	24	+10	-05	21	33	45	53	57	59	54	6.0	
6.5	-0.002	58	54	47	36	22	+07	-08	23	36	47	55	59	58	6.5	
7.0	+0.001	59	58	53	45	33	19	+04	-11	25	39	49	56	59	7.0	
7.5	04	56	59	57	52	42	30	16	+01	14	28	41	50	56	7.5	
8.0	06	51	58	58	55	49	39	28	14	-01	16	30	42	51	8.0	
8.5	09	42	51	55	57	54	47	37	25	+11	-03	18	31	42	8.5	
9.0	10	32	43	50	55	55	52	45	36	23	+09	-05	20	32	9.0	
9.5	12	20	33	43	50	54	54	51	44	34	22	+08	-07	20	9.5	
10.0	12	07	21	32	43	50	53	53	50	43	33	21	+07	-07	10.0	
10.5	12	07	+07	21	33	43	50	53	53	50	43	32	21	+07	10.5	
11.0	12	20	-07	+08	22	34	44	51	54	54	50	43	33	20	11.0	
11.5	10	32	20	-05	+09	23	36	45	52	55	55	50	43	32	11.5	
12.0	09	42	31	18	-03	+11	25	37	47	54	57	55	51	42	12.0	
12.5	06	51	43	30	16	-01	14	27	39	49	55	58	58	51	12.5	
13.0	04	56	50	41	28	14	+01	16	31	42	52	57	59	56	13.0	
13.5	+0.001	59	56	49	39	26	-11	+04	19	32	45	53	58	59	13.5	
14.0	-0.002	-0.0058	-59	-55	-47	-36	-23	-08	+07	+22	+36	+46	+54	+58	14.0	
		12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	24h		

Arg. ( ( - Γ' )	Δ' a	Δ'''a								Arg. ( ( - Γ' )	Δ' a	Δ'''a							
		0h 12h	1h 11h	2h 10h	3h 9h	4h 8h	5h 7h	6h 6h	0h 12h			1h 11h	2h 10h	3h 9h	4h 8h	5h 7h	6h 6h		
0	+0.000	.0000	+0	+0	+0	+0	+0	+0	14	-0.000	.0000	-0	-0	-1	-1	-1	-1	-1	-1
1	1	0	1	2	3	4	4	4	15	1	0	1	2	3	3	4	4	4	4
2	2	0	2	4	6	7	8	8	16	2	0	2	4	6	8	9	9	9	9
3	3	0	3	6	8	10	11	11	17	3	0	3	6	9	10	12	12	12	12
4	4	0	4	7	10	12	14	14	18	4	0	4	7	10	13	14	14	14	14
5	5	0	4	8	11	14	16	16	19	5	0	4	8	12	14	16	16	16	16
6	6	0	5	9	13	15	17	18	20	6	0	5	9	13	15	17	17	17	17
7	7	0	5	9	13	16	18	18	21	7	0	5	9	13	15	17	17	17	17
8	8	0	4	9	12	15	17	17	22	8	0	4	9	12	15	17	17	17	17
9	9	0	4	8	11	14	15	16	23	9	0	4	8	11	13	15	15	15	15
10	3	0	3	7	10	12	13	14	24	3	0	3	7	9	11	13	13	13	13
11	2	0	3	5	8	9	10	11	25	2	0	3	5	7	9	10	10	10	10
12	2	0	2	4	5	6	7	7	26	1	0	2	3	4	5	6	6	6	6
13	1	0	+1	+2	+2	+3	+3	+3	27	1	0	-1	-1	-2	-2	-2	-2	-2	-2
14	+0.000	.0000	0	0	-1	-1	-1	-1	28	-0.000	.0000	0	+1	+1	+2	+2	+2	+2	+2
		12h	13h	14h	15h	16h	17h	18h				12h	13h	14h	15h	16h	17h	18h	
		24h	23h	22h	21h	20h	19h	18h				24h	23h	22h	21h	20h	19h	18h	

Δ'' a and Δ''' a are to be multiplied by tan δ and their signs changed when a > 12h.

The Arguments, (2 ( ) and ( ( - Γ' ), are given in Table IV. for the beginning of each month.

# TABLE VII.

TABLES FOR FINDING THE REDUCTIONS OF MEAN TO APPARENT DECLINATIONS WHICH DEPEND ON  $2\zeta$  AND  $(\zeta - \Gamma)$ .

Hor. Arg. = Star's Right Ascension.

Arg. (2ζ)	Δ δ												Arg. (2ζ)	
	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h		12h
0.0	-.00	+.02	+.04	+.06	+.08	+.08	+.09	+.08	+.08	+.06	+.04	+.02	+.00	0.0
0.5	.02	.00	.02	.05	.07	.08	.09	.09	.08	.07	.06	.04	.02	0.5
1.0	.04	-.01	+.01	.03	.05	.07	.08	.09	.09	.08	.07	.06	.04	1.0
1.5	.05	.03	-.01	+.01	.03	.05	.07	.08	.09	.08	.08	.07	.05	1.5
2.0	.06	.05	.03	-.01	+.01	.03	.05	.07	.08	.08	.08	.08	.06	2.0
2.5	.07	.06	.05	.03	-.01	+.02	.04	.05	.07	.08	.08	.08	.07	2.5
3.0	.08	.07	.06	.04	.03	.00	+.02	.04	.05	.07	.08	.08	.08	3.0
3.5	.08	.08	.07	.05	.04	-.02	-.01	+.02	.04	.05	.07	.08	.08	3.5
4.0	.08	.08	.08	.07	.06	.04	.02	.00	+.02	.04	.06	.07	.08	4.0
4.5	.07	.08	.08	.08	.08	.06	.05	-.02	.00	+.02	.04	.06	.07	4.5
5.0	.06	.07	.08	.08	.08	.07	.06	.04	-.02	.00	+.02	.04	.06	5.0
5.5	.05	.06	.08	.08	.09	.08	.07	.06	.04	-.02	.00	.03	.05	5.5
6.0	.03	.05	.07	.08	.09	.09	.08	.07	.06	.04	-.02	+.01	.03	6.0
6.5	-.01	.03	.05	.07	.08	.09	.09	.08	.07	.05	.03	-.01	+.01	6.5
7.0	+.01	-.02	.04	.06	.07	.08	.09	.09	.08	.07	.05	.03	-.01	7.0
7.5	.02	.00	-.02	.04	.06	.07	.08	.09	.08	.08	.06	.04	.02	7.5
8.0	.04	+.02	.00	-.02	.04	.06	.08	.08	.09	.08	.07	.06	.04	8.0
8.5	.06	.04	+.01	.00	.03	.05	.06	.08	.08	.08	.08	.07	.06	8.5
9.0	.07	.05	.03	+.01	-.01	.03	.05	.06	.08	.08	.08	.08	.07	9.0
9.5	.08	.07	.05	.03	+.01	-.01	.03	.05	.06	.07	.08	.08	.08	9.5
10.0	.08	.08	.06	.05	.03	+.01	-.01	.03	.05	.06	.07	.08	.08	10.0
10.5	.08	.08	.07	.06	.05	.03	+.01	-.01	.03	.05	.06	.07	.08	10.5
11.0	.08	.08	.08	.07	.06	.05	.03	+.01	-.01	.03	.05	.07	.08	11.0
11.5	.07	.08	.08	.08	.07	.06	.05	.03	+.01	-.01	.04	.05	.07	11.5
12.0	.06	.07	.08	.08	.08	.08	.06	.05	.03	+.01	-.02	.04	.06	12.0
12.5	.04	.06	.07	.08	.09	.08	.08	.06	.05	.02	.00	-.02	.04	12.5
13.0	+.02	.05	.06	.08	.09	.09	.08	.08	.06	.04	+.02	.00	-.02	13.0
13.5	.00	.03	.05	.07	.08	.09	.09	.08	.07	.06	.04	+.02	.00	13.5
14.0	-.01	+.01	+.03	+.05	+.07	+.08	+.09	+.09	+.08	+.07	+.05	+.03	+.01	14.0
	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	24h	

Arg. ( $(\zeta - \Gamma)$ )	$\Delta' \delta$							Arg. ( $(\zeta - \Gamma)$ )	$\Delta' \delta$						
	0h	1h	2h	3h	4h	5h	6h		0h	1h	2h	3h	4h	5h	6h
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	.01	.01	.01	.00	.00	.00	.00	15	.01	.01	.01	.00	.00	.00	.00
2	.01	.01	.01	.01	.01	.00	.00	16	.01	.01	.01	.01	.01	.00	.00
3	.02	.02	.01	.01	.01	.00	.00	17	.02	.02	.02	.02	.01	.01	.00
4	.02	.02	.02	.01	.01	.00	.00	18	.02	.02	.02	.02	.02	.01	.01
5	.02	.02	.02	.02	.01	.01	.00	19	.02	.02	.02	.02	.02	.01	.01
6	.03	.03	.02	.02	.01	.01	.00	20	.03	.03	.02	.02	.02	.01	.01
7	.03	.03	.02	.02	.01	.01	.00	21	.03	.03	.02	.02	.02	.01	.01
8	.03	.02	.02	.02	.01	.01	.00	22	.03	.02	.02	.02	.02	.01	.01
9	.02	.02	.02	.02	.01	.01	.00	23	.02	.02	.02	.02	.02	.01	.01
10	.02	.02	.02	.01	.01	.00	.00	24	.02	.02	.02	.02	.01	.01	.00
11	.02	.02	.01	.01	.01	.00	.00	25	.01	.01	.01	.01	.01	.00	.00
12	.01	.01	.01	.01	.01	.00	.00	26	.01	.01	.01	.01	.00	.00	.00
13	.01	.00	.00	.00	.00	.00	.00	27	.00	.00	.00	.00	.00	.00	.00
14	+.00	+.00	+.00	+.00	+.00	+.00	0.00	28	-.00	-.00	-.00	-.00	-.00	-.00	0.00
	12h	11h	10h	9h	8h	7h	6h		12h	11h	10h	9h	8h	7h	6h
	12h	13h	14h	15h	16h	17h	18h		12h	13h	14h	15h	16h	17h	18h

Change the signs of  $\Delta \delta$  and  $\Delta' \delta$  when  $\alpha$  is found at the bottom of the table.  
The Arguments, ( $2\zeta$ ) and  $(\zeta - \Gamma)$ , are given in Table IV. for the beginning of each month.

# TABLE VIII.

## REDUCTION OF THE MEAN PLACES OF FUNDAMENTAL STARS IN THE STAR TABLES OF THE AMERICAN EPHEMERIS TO NEWCOMB'S RIGHT ASCENSIONS\* AND AUWERS' DECLINATIONS.†

‡ denotes the number of years from 1870.0.

	R. A.	$\Delta\alpha$		$\Delta\delta$	
	<sup>h</sup>				
$\alpha$ Andromedæ . . . . .	0	+0.029	+0.0003 ‡	—0.45	—0.0052 ‡
$\gamma$ Pegasi . . . . .	0	+ .014	—0.0008 ‡	— .54	—0.0075 ‡
$\alpha$ Cassiopeiæ . . . . .	0	. . . . .	. . . . .	— .24	—0.0017 ‡
$\alpha$ Ursæ Minoris . . . . .	1	. . . . .	. . . . .	+ .02	—0.0017 ‡
$\alpha$ Arietis . . . . .	1	+ .014	—0.0006 ‡	— .06	+0.0026 ‡
$\alpha$ Ceti . . . . .	2	+ .012	—0.0001 ‡	— .01	+0.0007 ‡
$\alpha$ Persei . . . . .	3	. . . . .	. . . . .	+ .05	+0.0047 ‡
$\alpha$ Tauri . . . . .	4	— .007	—0.0002 ‡	— .39	—0.0030 ‡
$\alpha$ Aurigæ . . . . .	5	— .005	—0.0005 ‡	— .02	+0.0012 ‡
$\beta$ Orionis . . . . .	5	+ .003	—0.0002 ‡	— .35	—0.0033 ‡
$\beta$ Tauri . . . . .	5	+ .013	+0.0002 ‡	— .23	—0.0051 ‡
$\alpha$ Orionis . . . . .	5	— .019	—0.0003 ‡	— .04	+0.0058 ‡
$\alpha$ Canis Majoris . . . . .	6	— .003	—0.0007 ‡	.00	.0000 ‡
$\alpha^2$ Geminorum . . . . .	7	. . . . .	. . . . .	+ .60	+0.0170 ‡
$\alpha$ Canis Minoris . . . . .	7	— .086	—0.0018 ‡ ‡	+ .22	+0.0114 ‡
$\beta$ Geminorum . . . . .	7	— .017	—0.0003 ‡	— .57	—0.0111 ‡
$\alpha$ Hydræ . . . . .	9	— .015	—0.0002 ‡	— .39	—0.0015 ‡
$\alpha$ Leonis . . . . .	10	— .036	—0.0010 ‡	— .71	—0.0137 ‡
$\alpha$ Ursæ Majoris . . . . .	10	. . . . .	. . . . .	+ .07	—0.0023 ‡
$\beta$ Leonis . . . . .	11	— .008	—0.0004 ‡	— .60	—0.0121 ‡
$\gamma$ Ursæ Majoris . . . . .	11	. . . . .	. . . . .	— .19	—0.0034 ‡
$\alpha$ Virginis . . . . .	13	— .023	—0.0012 ‡	— .43	—0.0185 ‡
$\eta$ Ursæ Majoris . . . . .	13	. . . . .	. . . . .	— .15	—0.0044 ‡
$\alpha$ Bootis . . . . .	14	+ .018	+0.0002 ‡	— .73	—0.0133 ‡
$\alpha^2$ Libræ . . . . .	14	+ .001	.0000 ‡	— .66	—0.0061 ‡
$\beta$ Ursæ Minoris . . . . .	14	. . . . .	. . . . .	+ .15	—0.0036 ‡
$\alpha$ Coronæ Borealis . . . . .	15	+ .017	—0.0005 ‡	— .34	—0.0032 ‡
$\alpha$ Serpentis . . . . .	15	+ .030	+0.0001 ‡	— .23	+0.0014 ‡
$\alpha$ Scorpii . . . . .	16	— .019	—0.0012 ‡	— .71	—0.0011 ‡
$\alpha^1$ Herculis . . . . .	17	+ .028	—0.0004 ‡	— .55	—0.0057 ‡
$\alpha$ Ophiuchi . . . . .	17	+ .042	+0.0001 ‡	+ .01	+0.0055 ‡
$\gamma$ Draconis . . . . .	17	. . . . .	. . . . .	— .39	—0.0023 ‡
$\delta$ Ursæ Minoris . . . . .	18	. . . . .	. . . . .	— .32	—0.0151 ‡
$\alpha$ Lyræ . . . . .	18	+ .029	—0.0004 ‡	— .32	—0.0087 ‡
$\gamma$ Aquilæ . . . . .	19	+ .030	—0.0004 ‡	— .16	+0.0018 ‡
$\alpha$ Aquilæ . . . . .	19	+ .043	—0.0003 ‡	— .28	+0.0023 ‡
$\beta$ Aquilæ . . . . .	19	+ .043	+0.0003 ‡	— .63	—0.0081 ‡
$\alpha^2$ Capricorni . . . . .	20	+ .051	+0.0006 ‡	— .46	—0.0012 ‡
$\alpha$ Cygni . . . . .	20	+ .040	.0000 ‡	— .05	+0.0009 ‡
$\alpha$ Cephei . . . . .	21	. . . . .	. . . . .	+ .14	+0.0032 ‡
$\beta$ Cephei . . . . .	21	. . . . .	. . . . .	— .13	—0.0040 ‡
$\alpha$ Aquarii . . . . .	21	+ .024	—0.0003 ‡	+ .27	+0.0185 ‡
$\alpha$ Piscis Australis . . . . .	22	+ .015	—0.0008 ‡	— .53	—0.0046 ‡
$\alpha$ Pegasi . . . . .	22	+ .026	—0.0005 ‡	— .36	+0.0005 ‡

\* On the Right Ascensions of fundamental stars, by Simon Newcomb, (*Washington Astronomical Observations*, 1870, Appendix III.)

† *Astronomische Nachrichten*, No. 1550.

‡ + the periodic term of  $g$ , (*Ast. Nach.*, No. 1373.)

|| +  $r$ , (*Ast. Nach.*, No. 1373.)

# SUPPLEMENT TO THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC,

FOR THE YEARS

1878, 1879, 1880, and 1881.

## TABLES FOR FINDING THE LATITUDE OF A PLACE BY ALTITUDES OF POLARIS.

The formula,\* on which these tables are based, is

$$L = h - p \cos t + \frac{1}{2} p^2 \sin 1'' \sin^2 t \tan h \\ - \frac{1}{8} p^2 \sin^2 1'' \cos t \sin^2 t + \frac{1}{8} p^4 \sin^3 1'' \sin^4 t \tan^3 h;$$

in which

$L$  = the latitude of the place, and

$h$  = the true altitude,

$p$  = the polar distance, and

$t$  = the hour angle of the star.

Table A contains for the declination  $88^\circ 40'$ , or  $p_0 = 1^\circ 20' = 4800''$ , the *first correction*,

$$A = -p_0 \cos t - \frac{1}{8} p_0^2 \sin^2 1'' \cos t \sin^2 t;$$

Argument, the hour angle of the star, or  $24^h$  — the hour angle.

Table B contains the *second correction*,

$$B = \frac{1}{2} p_0^2 \sin 1'' \sin^2 t \tan h + \frac{1}{8} p_0^4 \sin^3 1'' \sin^4 t \tan^3 h;$$

Arguments, the true altitude of the star and the hour angle, or  $24^h$  — the hour angle. This correction is always *additive*.

Table C contains the *third correction*,

$$C = \frac{1}{2} (p^2 - p_0^2) \sin 1'' \sin^2 t \tan h;$$

Arguments,  $B$  and the declination of the star from  $88^\circ 39' 20''$  to  $88^\circ 41' 20''$ .

Table D contains the *fourth correction*,

$$- (p - p_0) \cos t - \frac{1}{8} (p^2 - p_0^2) \sin^2 1'' \cos t \sin^2 t;$$

Arguments,  $A$  and the declination of the star from  $88^\circ 39' 20''$  to  $88^\circ 41' 20''$ .

The quantities are given to the nearest  $0''.1$ : a . placed after some of them indicates a doubt between the figure given and the next highest, or that the correct value is  $0''.05$  greater than that given. Thus,  $3''.7$  indicates the actual value  $3''.75$ .

The method of using these tables is as follows:

Reduce the observed altitude of the star to the true altitude, and the noted time of the observation to the sidereal time of the place.

Find from the Ephemeris the apparent right ascension and declination of the star at the time of observation.†

\* CHAUVENET'S *Spherical and Practical Astronomy*, Vol. I., p. 256.

† If great precision is aimed at, the tables in the Ephemeris may be interpolated for the hour angle at the prime meridian, i. e., the local hour angle + the longitude; (west longitudes being regarded as positive.) The solar date with which to enter will be one day *later* than the astronomical day of observation in the case of a *west* hour angle, which added to the mean time of culmination gives more than  $24^h$  or  $1^d$ ; and one day *earlier* in the case of an *east* hour angle, which is numerically greater than the mean time of culmination. In the American Ephemeris the mean time of culmination is given to tenths of a day.



## LATITUDE BY ALTITUDES OF POLARIS.

Subtracting the right ascension from the sidereal time will give the star's hour angle *west* or +; subtracting the sidereal time from the right ascension will give the hour angle *east* or —. If it is more than  $12^h$ , subtract it from  $24^h$  and change the sign.

1. With this hour angle take out the *first correction*,  $A$ , from Table A, giving to it the sign — when the hour angle is numerically *less* than  $6^h$ ; the sign + when the hour angle is *greater* than  $6^h$ .

2. With this hour angle and altitude take out the *second correction*,\*  $B$ , from Table B. The sign of this correction is always +.

3. With  $B$  and the declination take out the *third correction*,  $C$ , from Table C, giving it the sign + when the declination is less than  $88^\circ 40'$ ; — when the declination is greater than  $88^\circ 40'$ .

4. With  $A$  and the declination take out the *fourth correction*,  $D$ , from Table D, giving it the same sign as that of  $A$ , when the declination is less than  $88^\circ 40'$ ; the opposite sign when the declination is greater than  $88^\circ 40'$ .

5. Combine these corrections with the true altitude according to their signs: the result is the latitude of the place of observation.

When great precision is required, or the intervals are great, it will be necessary to take out the *first* and *second corrections* for each observation separately; in other cases, the mean of the times may be used. The means of these two corrections may always be used for finding the *third* and *fourth corrections*; and these four quantities may be combined with the mean of the altitudes.

If the nearest  $10''$  suffices for each correction, they may be taken out with the nearest arguments without interpolation; and all but the *first* may be thus taken out when a precision of  $3''$  is required.

If a precision of  $1'$  is sufficient for each correction, as is ordinarily the case at sea, an hour angle within  $3^m$  will suffice for Table A; Tables C and D may be neglected, and Table B used only when the altitude exceeds  $47^\circ$ .

*Example.*—1878, June 7,  $1^h 16^m 35^s$  A. M., mean time, in longitude  $30^\circ$  West of Washington, suppose the corrected altitude of Polaris to be  $47^\circ 18' 25''$ , required the latitude of the place.

	Local astronomical mean time	June 6, 13 16 35.0
p. 326	Sidereal time at mean noon of June 6,	4 59 54.0
App'x, Table III,	corresponding to $13^h 16^m 35^s$ ,	+ 2 10.9
" "	" to the long. = $+ 2^h 0^m 0^s$ ,	+ 19.7
	Local sidereal time,	18 18 59.6
p. 264	Polaris. App't Dec. $+ 88^\circ 39' 27''.9$	App't R. A. 1 13 30.7
		Hour angle, + 17 5 28.9
	(Hour angle at Washington, — $4^h 54^m$ )	or — 6 54 31.1

The right ascension and declination are interpolated *back*  $4^h 54^m = 0^d.2$  from these given for June 6.8; or forward  $19^h 6^m = 0^d.8$  from these given for June 5.8.

Corrected altitude,		$47^\circ 18' 25.0''$
Table A, corresponding to the hour angle,	$A = +$	18 51.2
" B, " " altitude and hour angle,	$B = +$	57.1
" C, " " declination and $B$ ,	$C = +$	0.7
" D, " " declination and $A$ ,	$D = +$	7.6
Latitude,		+ 47 38 21.6

\* If the altitude is greater than  $60^\circ$ , this correction may be found by taking that for  $45^\circ$  and multiplying it by the tangent of the altitude; adding, if desirable, the second term in the expression for  $B$ , viz:  $+ 0''.0076 \sin^2 \delta \tan^2 h$ .

# TABLE A.

## FOR FINDING THE LATITUDE OF A PLACE BY ALTITUDES OF POLARIS.

*A* = 1st Correction. Argument, the star's hour angle, (or 24<sup>h</sup> — the star's hour angle.)

	0 <sup>a</sup>	1 <sup>a</sup>	2 <sup>a</sup>	3 <sup>a</sup>	4 <sup>a</sup>	5 <sup>a</sup>	
0	-1 20 0.0	-1 17 16.5	-1 9 17.1	-0 56 34.4	-0 40 0.3	-0 20 42.5	60
1	19 59.9	17 11.0	9 6.6	56 19.6	39 42.2	20 22.3	59
2	19 59.8	17 5.5	8 56.0	56 4.7	39 24.0	20 2.0	58
3	19 59.6	16 59.8	8 45.3	55 49.7	39 5.7	19 41.7	57
4	19 59.3	16 54.1	8 34.6	55 34.7	38 47.4	19 21.4	56
5	-1 19 58.9	-1 16 48.3	-1 8 23.8	-0 55 19.6	-0 38 29.1	-0 19 1.1	55
6	19 58.4	16 42.4	8 12.9	55 4.4	38 10.7	18 40.7	54
7	19 57.8	16 36.4	8 1.9	54 49.2	37 52.2	18 20.3	53
8	19 57.1	16 30.3	7 50.8	54 33.9	37 33.8	17 59.9	52
9	19 56.3	16 24.2	7 39.7	54 18.6	37 15.3	17 39.5	51
10	-1 19 55.4	-1 16 17.9	-1 7 28.5	-0 54 3.1	-0 36 56.7	-0 17 19.1	50
11	19 54.5	16 11.6	7 17.2	53 47.7	36 38.1	16 58.6	49
12	19 53.4	16 5.1	7 5.8	53 32.1	36 19.5	16 38.1	48
13	19 52.3	15 58.6	6 54.4	53 16.5	36 0.8	16 17.6	47
14	19 51.0	15 52.0	6 42.9	53 0.9	35 42.0	15 57.1	46
15	-1 19 49.7	-1 15 45.3	-1 6 31.3	-0 52 45.2	-0 35 23.3	-0 15 36.6	45
16	19 48.3	15 38.6	6 19.6	52 29.4	35 4.5	15 16.0	44
17	19 46.8	15 31.7	6 7.8	52 13.6	34 45.6	14 55.5	43
18	19 45.2	15 24.8	5 56.0	51 57.7	34 26.8	14 34.9	42
19	19 43.5	15 17.7	5 44.1	51 41.7	34 7.8	14 14.3	41
20	-1 19 41.7	-1 15 10.6	-1 5 32.2	-0 51 25.7	-0 33 48.9	-0 13 53.7	40
21	19 39.9	15 3.4	5 20.1	51 9.6	33 29.9	13 33.0	39
22	19 37.9	14 56.1	5 8.0	50 53.5	33 10.8	13 12.4	38
23	19 35.9	14 48.7	4 55.8	50 37.3	32 51.7	12 51.7	37
24	19 33.7	14 41.3	4 43.5	50 21.1	32 32.6	12 31.0	36
25	-1 19 31.5	-1 14 33.7	-1 4 31.2	-0 50 4.8	-0 32 13.5	-0 12 10.3	35
26	19 29.1	14 26.1	4 18.8	49 48.4	31 54.3	11 49.6	34
27	19 26.7	14 18.4	4 6.3	49 32.0	31 35.1	11 28.9	33
28	19 24.2	14 10.6	3 53.7	49 15.5	31 15.8	11 8.1	32
29	19 21.6	14 2.7	3 41.1	48 59.0	30 56.5	10 47.4	31
30	-1 19 18.9	-1 13 54.7	-1 3 28.3	-0 48 42.4	-0 30 37.2	-0 10 26.6	30
31	19 16.2	13 46.7	3 15.6	48 25.7	30 17.8	10 5.9	29
32	19 13.3	13 38.5	3 2.7	48 9.0	29 58.4	9 45.1	28
33	19 10.3	13 30.3	2 49.8	47 52.3	29 38.9	9 24.3	27
34	19 7.3	13 22.0	2 36.8	47 35.5	29 19.5	9 3.5	26
35	-1 19 4.1	-1 13 13.6	-1 2 23.7	-0 47 18.6	-0 29 0.5	-0 8 42.6	25
36	19 0.9	13 5.1	2 10.6	47 1.7	28 40.4	8 21.8	24
37	18 57.6	12 56.6	1 57.4	46 44.7	28 20.9	8 1.0	23
38	18 54.2	12 47.9	1 44.1	46 27.7	28 1.3	7 40.1	22
39	18 50.7	12 39.2	1 30.7	46 10.6	27 41.6	7 19.3	21
40	-1 18 47.1	-1 12 30.4	-1 1 17.3	-0 45 53.5	-0 27 22.0	-0 6 58.4	20
41	18 43.4	12 21.5	1 3.8	45 36.3	27 2.3	6 37.6	19
42	18 39.6	12 12.6	0 50.2	45 19.1	26 42.5	6 16.7	18
43	18 35.8	12 3.5	0 36.6	45 1.8	26 22.8	5 55.8	17
44	18 31.8	11 54.4	0 22.9	44 44.5	26 3.0	5 34.9	16
45	-1 18 27.8	-1 11 45.1	-1 0 9.1	-0 44 27.1	-0 25 43.2	-0 5 14.0	15
46	18 23.7	11 35.8	0 59 55.3	44 9.6	25 23.3	4 53.1	14
47	18 19.4	11 26.5	59 41.4	43 52.1	25 3.4	4 32.2	13
48	18 15.1	11 17.0	59 27.4	43 34.6	24 43.5	4 11.3	12
49	18 10.8	11 7.4	59 13.3	43 17.0	24 23.6	3 50.3	11
50	-1 18 6.3	-1 10 57.8	-0 58 59.2	-0 42 59.4	-0 24 3.6	-0 3 29.4	10
51	18 1.7	10 48.1	58 45.0	42 41.7	23 43.6	3 8.5	9
52	17 57.0	10 38.3	58 30.8	42 23.9	23 23.6	2 47.5	8
53	17 52.3	10 28.4	58 16.5	42 6.1	23 3.6	2 26.6	7
54	17 47.4	10 18.5	58 2.1	41 48.3	22 43.5	2 5.7	6
55	-1 17 42.5	-1 10 8.5	-0 57 47.6	-0 41 30.4	-0 22 23.4	-0 1 44.7	5
56	17 37.5	9 58.4	57 33.1	41 12.5	22 3.3	1 23.8	4
57	17 32.4	9 48.2	57 18.5	40 54.5	21 43.1	1 2.8	3
58	17 27.2	9 37.9	57 3.9	40 36.5	21 23.0	0 41.9	2
59	17 21.9	9 27.5	56 49.2	40 18.4	21 2.8	0 20.9	1
60	-1 17 16.5	-1 9 17.1	-0 56 34.4	-0 40 0.3	-0 20 42.5	-0 0 0.0	0
	11 <sup>a</sup>	10 <sup>a</sup>	9 <sup>a</sup>	8 <sup>a</sup>	7 <sup>a</sup>	6 <sup>a</sup>	

Change the sign to + when the argument is found at the bottom.

# TABLE B.

FOR FINDING THE LATITUDE OF A PLACE BY ALTITUDES OF POLARIS.

*B* = the 2d correction. This correction is always additive.

Star's Hour	STAR'S ALTITUDE.											Star's Hour
	Angle.	10°	15°	16°	17°	18°	19°	20°	21°	22°	23°	Angle.
h m	"	"	"	"	"	"	"	"	"	"	"	h m
0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12 0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11 50
20	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	40
30	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	30
40	0.3	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	20
50	0.5	0.7	0.7	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.1	10
1 0	0.6	1.0	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.6	0
10	0.9	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1	10 50
20	1.1	1.7	1.9	2.0	2.1	2.2	2.4	2.4	2.5	2.6	2.8	40
30	1.4	2.2	2.3	2.5	2.7	2.8	3.0	3.1	3.3	3.5	3.7	30
40	1.8	2.7	2.9	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.7	20
50	2.1	3.2	3.4	3.6	3.9	4.1	4.3	4.6	4.8	5.0	5.8	10
2 0	2.5	3.7	4.0	4.3	4.5	4.8	5.1	5.4	5.6	5.9	6.9	0
10	2.8	4.3	4.6	4.9	5.2	5.5	5.9	6.2	6.5	6.8	8.1	9 50
20	3.2	4.9	5.3	5.6	6.0	6.3	6.7	7.0	7.4	7.8	9.4	40
30	3.6	5.5	5.9	6.3	6.7	7.1	7.5	7.9	8.4	8.8	10.7	30
40	4.1	6.2	6.6	7.0	7.5	7.9	8.4	8.9	9.3	9.8	12.0	20
50	4.5	6.8	7.3	7.8	8.3	8.8	9.3	9.8	10.3	10.8	13.3	10
3 0	4.9	7.5	8.0	8.5	9.1	9.6	10.2	10.7	11.3	11.8	14.6	0
10	5.3	8.1	8.7	9.3	9.8	10.4	11.0	11.6	12.3	12.9	16.0	8 50
20	5.8	8.8	9.4	10.0	10.6	11.3	11.9	12.6	13.2	13.9	17.3	40
30	6.2	9.4	10.1	10.7	11.4	12.1	12.8	13.5	14.2	14.9	18.8	30
40	6.6	10.0	10.7	11.4	12.2	12.9	13.6	14.4	15.1	15.9	20.0	20
50	7.0	10.6	11.4	12.1	12.9	13.7	14.5	15.2	16.0	16.9	21.5	10
4 0	7.4	11.2	12.0	12.8	13.6	14.4	15.2	16.1	16.9	17.8	23.0	0
10	7.7	11.8	12.6	13.4	14.3	15.1	16.0	16.9	17.7	18.6	24.5	7 50
20	8.1	12.3	13.1	14.0	14.9	15.8	16.7	17.6	18.5	19.5	26.0	40
30	8.4	12.8	13.7	14.6	15.5	16.4	17.3	18.3	19.3	20.2	27.5	30
40	8.7	13.2	14.1	15.1	16.0	17.0	17.9	18.9	19.9	20.9	29.0	20
50	9.0	13.6	14.6	15.5	16.5	17.5	18.5	19.5	20.5	21.6	30.5	10
5 0	9.2	14.0	14.9	15.9	16.9	17.9	19.0	20.0	21.1	22.1	32.0	0
10	9.4	14.3	15.3	16.3	17.3	18.3	19.4	20.4	21.5	22.6	33.5	6 50
20	9.6	14.5	15.5	16.6	17.6	18.6	19.7	20.8	21.9	23.0	35.0	40
30	9.7	14.7	15.7	16.8	17.8	18.9	20.0	21.1	22.2	23.3	36.5	30
40	9.8	14.8	15.9	16.9	18.0	19.1	20.2	21.3	22.4	23.5	38.0	20
50	9.8	14.9	16.0	17.0	18.1	19.2	20.3	21.4	22.5	23.7	39.5	10
6 0	9.8	15.0	16.0	17.1	18.1	19.2	20.3	21.4	22.6	23.7	41.0	0

# TABLE C.

*C* = the 3d correction. Hor. Arg., the star's declination. Vert. Arg., *B* = the 2d correction.

B.	88° 39'				88° 40'						88° 41'		
	20"	30"	40"	50"	0"	10"	20"	30"	40"	50"	0"	10"	20"
"	"	"	"	"	"	"	"	"	"	"	"	"	"
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	+0.2	+0.1	+0.1	+0.0	0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3
20	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7
30	0.5	0.4	0.2	0.1	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0
40	0.7	0.5	0.3	0.2	0.0	-0.2	0.3	0.5	0.7	0.8	1.0	1.2	1.3
50	+0.8	+0.6	+0.4	+0.2	0.0	+0.2	-0.4	-0.6	-0.8	-1.0	-1.2	-1.4	-1.7

NOTE.—Below 15° *B* is nearly proportional to the altitude.

# TABLE B.

FOR FINDING THE LATITUDE OF A PLACE BY ALTITUDES OF POLARIS.

*B* = the 2d correction. This correction is always additive.

Star's Hour	STAR'S ALTITUDE										Star's Hour
	24°	25°	26°	27°	28°	29°	30°	31°	32°	33°	
h m	"	"	"	"	"	"	"	"	"	"	h m
0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12 0
10 0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	11 50
20 0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	40
30 0	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	30
40 0	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0	20
50 0	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.7	10
1 0	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4	0
10 10	2.2	2.3	2.5	2.6	2.7	2.8	2.9	3.0	3.2	3.3	10 50
20 10	2.9	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	40
30 10	3.6	3.8	4.0	4.2	4.3	4.5	4.7	4.9	5.1	5.3	30
40 10	4.4	4.7	4.9	5.1	5.3	5.5	5.8	6.0	6.2	6.5	20
50 10	5.3	5.5	5.8	6.1	6.3	6.6	6.9	7.1	7.4	7.7	10
2 0	6.2	6.5	6.8	7.1	7.4	7.7	8.1	8.4	8.7	9.1	0
10 20	7.2	7.5	7.9	8.2	8.6	8.9	9.3	9.7	10.1	10.5	9 50
20 20	8.2	8.6	9.0	9.4	9.8	10.2	10.6	11.0	11.5	11.9	40
30 20	9.2	9.7	10.1	10.5	11.0	11.5	11.9	12.4	12.9	13.4	30
40 20	10.3	10.8	11.2	11.8	12.3	12.8	13.3	13.9	14.4	15.0	20
50 20	11.3	11.9	12.4	13.0	13.5	14.1	14.7	15.3	15.9	16.6	10
3 0	12.4	13.0	13.6	14.2	14.8	15.5	16.1	16.8	17.5	18.1	0
10 30	13.5	14.1	14.8	15.5	16.1	16.8	17.5	18.2	19.0	19.7	8 50
20 30	14.6	15.3	16.0	16.7	17.4	18.2	18.9	19.7	20.5	21.3	40
30 30	15.6	16.4	17.1	17.9	18.7	19.5	20.3	21.1	22.0	22.8	30
40 30	16.7	17.5	18.3	19.1	19.9	20.8	21.6	22.5	23.4	24.3	20
50 30	17.7	18.5	19.4	20.2	21.1	22.0	22.9	23.9	24.8	25.8	10
4 0	18.6	19.5	20.4	21.3	22.3	23.2	24.2	25.2	26.2	27.2	0
10 40	19.6	20.5	21.4	22.4	23.4	24.3	25.4	26.4	27.5	28.5	7 50
20 40	20.4	21.4	22.4	23.4	24.4	25.4	26.5	27.6	28.7	29.8	40
30 40	21.2	22.2	23.2	24.3	25.3	26.4	27.5	28.6	29.8	31.0	30
40 40	22.0	23.0	24.1	25.1	26.2	27.3	28.5	29.6	30.8	32.0	20
50 40	22.6	23.7	24.8	25.9	27.0	28.2	29.3	30.5	31.7	33.0	10
5 0	23.2	24.3	25.4	26.5	27.7	28.9	30.1	31.3	32.6	33.8	0
10 50	23.7	24.8	26.0	27.1	28.3	29.5	30.7	32.0	33.3	34.6	6 50
20 50	24.1	25.3	26.4	27.6	28.8	30.0	31.3	32.5	33.8	35.2	40
30 50	24.4	25.6	26.8	28.0	29.2	30.4	31.7	33.0	34.3	35.6	30
40 50	24.7	25.8	27.0	28.2	29.5	30.7	32.0	33.3	34.6	36.0	20
50 50	24.8	26.0	27.2	28.4	29.6	30.9	32.2	33.5	34.8	36.2	10
6 0	24.9	26.0	27.2	28.5	29.7	31.0	32.2	33.6	34.9	36.3	0

# TABLE C.

*C* = the 3d correction. Hor. Arg., the star's declination. Vert. Arg., *B* = the 2d correction.

<i>B.</i>	88° 39'				88° 40'						88° 41'		
	20"	30"	40"	50"	0"	10"	20"	30"	40"	50"	0"	10"	20"
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	+0.2	+0.1	+0.1	+0.0	0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3
20	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7
30	0.5	0.4	0.2	0.1	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0
40	0.7	0.5	0.3	0.2	0.0	-0.2	0.3	0.5	0.7	0.8	1.0	1.2	1.3
50	+0.8	+0.6	+0.4	+0.2	0.0	+0.2	-0.4	-0.6	-0.8	-1.0	-1.2	-1.4	-1.7

# TABLE B.

FOR FINDING THE LATITUDE OF A PLACE BY ALTITUDES OF POLARIS.

*B* = the 2d correction. This correction is always additive.

Star's Hour Angle.	STAR'S ALTITUDE										Star's Hour Angle.
	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	
h m	"	"	"	"	"	"	"	"	"	"	h m
0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19 0
10	0.1 .1	0.1 .1	0.1 .1	0.1 .1	0.1 .1	0.1 .1	0.1 .1	0.1 .1	0.1 .1	0.1 .1	11 50
20	0.3 .3	0.3 .3	0.3 .3	0.3 .3	0.3 .3	0.3 .3	0.4 .3	0.4 .3	0.4 .3	0.4 .3	40
30	0.6 .5	0.7 .4	0.7 .4	0.7 .4	0.7 .4	0.8 .5	0.8 .5	0.8 .5	0.9 .5	0.9 .5	30
40	1.1 .5	1.2 .5	1.2 .5	1.3 .6	1.3 .6	1.4 .7	1.4 .7	1.5 .7	1.5 .7	1.6 .7	20
50	1.8 .7	1.8 .6	1.9 .7	2.0 .7	2.0 .7	2.1 .7	2.2 .8	2.3 .8	2.4 .9	2.4 .8	10
1 0	2.5 .7	2.6 .8	2.7 .8	2.8 .8	2.9 .9	3.0 .9	3.1 .9	3.3 .0	3.4 .0	3.5 .0	0
10	3.4 .9	3.5 .9	3.7 .0	3.8 .0	3.9 .0	4.1 .1	4.2 .1	4.4 .1	4.5 .2	4.7 .2	10 50
20	4.4 .1	4.6 .1	4.7 .1	4.9 .1	5.1 .2	5.3 .2	5.5 .3	5.7 .3	5.9 .3	6.1 .4	40
30	5.5 .2	5.7 .3	5.9 .3	6.2 .3	6.4 .3	6.6 .4	6.9 .5	7.1 .5	7.4 .6	7.6 .6	30
40	6.7 .3	7.0 .3	7.2 .4	7.5 .4	7.8 .5	8.1 .5	8.4 .6	8.7 .6	9.0 .7	9.3 .7	20
50	8.0 .3	8.3 .3	8.6 .4	9.0 .5	9.3 .5	9.6 .5	10.0 .7	10.3 .8	10.7 .7	11.1 .8	10
2 0	9.4 .4	9.8 .5	10.1 .5	10.5 .5	10.9 .6	11.3 .6	11.7 .7	12.1 .8	12.6 .9	13.0 .9	0
10	10.9 .5	11.3 .5	11.7 .6	12.1 .6	12.6 .7	13.1 .8	13.5 .8	14.0 .9	14.5 .9	15.0 .9	9 50
20	12.4 .6	12.9 .6	13.3 .7	13.8 .7	14.4 .8	14.9 .8	15.4 .9	16.0 .9	16.5 .9	17.1 .9	40
30	14.0 .6	14.5 .7	15.0 .8	15.6 .8	16.2 .8	16.8 .9	17.4 .9	18.0 .9	18.6 .9	19.3 .9	30
40	15.6 .6	16.2 .7	16.8 .7	17.4 .8	18.0 .8	18.7 .9	19.4 .9	20.0 .9	20.8 .9	21.5 .9	20
50	17.2 .6	17.8 .7	18.5 .7	19.2 .8	19.9 .8	20.6 .9	21.4 .9	22.2 .9	22.9 .9	23.8 .9	10
3 0	18.8 .6	19.6 .7	20.3 .8	21.0 .8	21.8 .9	22.6 .9	23.4 .9	24.3 .9	25.1 .9	26.0 .9	0
10	20.5 .7	21.8 .7	22.1 .8	22.9 .9	23.7 .9	24.6 .9	25.5 .9	26.4 .9	27.3 .9	28.3 .9	8 50
20	22.1 .6	23.0 .7	23.8 .7	24.7 .8	25.6 .8	26.5 .9	27.5 .9	28.5 .9	29.5 .9	30.6 .9	40
30	23.7 .6	24.6 .6	25.5 .7	26.5 .7	27.5 .8	28.5 .8	29.5 .8	30.6 .8	31.7 .8	32.8 .8	30
40	25.3 .5	26.2 .6	27.2 .7	28.2 .7	29.3 .7	30.4 .8	31.4 .8	32.6 .8	33.7 .8	34.9 .8	20
50	26.8 .5	27.8 .5	28.9 .5	29.9 .6	31.0 .6	32.2 .6	33.3 .6	34.5 .6	35.8 .6	37.0 .6	10
4 0	28.2 .4	29.3 .5	30.4 .5	31.6 .5	32.7 .5	33.9 .5	35.1 .5	36.4 .5	37.7 .5	39.1 .5	0
10	29.6 .4	30.8 .5	31.9 .5	33.1 .5	34.3 .5	35.6 .5	36.9 .5	38.2 .5	39.6 .5	41.0 .5	7 50
20	30.9 .3	32.1 .4	33.3 .4	34.6 .4	35.8 .4	37.2 .4	38.5 .4	39.9 .4	41.3 .4	42.8 .4	40
30	32.2 .3	33.4 .3	34.6 .3	35.9 .3	37.2 .3	38.6 .3	40.0 .3	41.4 .3	42.9 .3	44.5 .3	30
40	33.3 .3	34.5 .3	35.8 .3	37.2 .3	38.5 .3	39.9 .3	41.4 .3	42.9 .3	44.4 .3	46.0 .3	20
50	34.3 .2	35.6 .2	36.9 .2	38.3 .2	39.7 .2	41.1 .2	42.6 .2	44.2 .2	45.7 .2	47.4 .2	10
5 0	35.1 .1	36.5 .1	37.9 .1	39.3 .1	40.7 .1	42.2 .1	43.7 .1	45.3 .1	46.9 .1	48.6 .1	0
10	35.9 .8	37.3 .8	38.7 .8	40.1 .8	41.6 .8	43.1 .8	44.7 .8	46.3 .8	47.9 .8	49.6 .8	6 50
20	36.5 .6	37.9 .6	39.3 .6	40.8 .6	42.3 .6	43.9 .6	45.4 .6	47.1 .6	48.8 .6	50.5 .6	40
30	37.0 .4	38.4 .4	39.9 .4	41.4 .4	42.9 .4	44.5 .4	46.1 .4	47.7 .4	49.4 .4	51.2 .4	30
40	37.4 .3	38.8 .3	40.3 .3	41.8 .3	43.3 .3	44.9 .3	46.5 .3	48.2 .3	49.9 .3	51.7 .3	20
50	37.6 .1	39.0 .1	40.5 .1	42.0 .1	43.5 .1	45.1 .1	46.8 .1	48.5 .1	50.2 .1	52.0 .1	10
6 0	37.7 .0	39.1 .0	40.6 .0	42.1 .0	43.6 .0	45.2 .0	46.9 .0	48.5 .0	50.3 .0	52.1 .0	0

# TABLE C.

*C* = the 3d correction. Hor. Arg., the star's declination. Vert. Arg., *B* = the 2d correction.

<i>B.</i>	88° 39'				88° 40'						88° 41'		
	20"	30"	40"	50"	0"	10"	20"	30"	40"	50"	0"	10"	20"
"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	+0.2	+0.1	+0.1	+0.0	0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3
20	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7
30	0.5	0.4	0.2	0.1	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0
40	0.7	0.5	0.3	0.2	0.0	-0.2	0.3	0.5	0.7	0.8	1.0	1.2	1.3
50	+0.8	+0.6	+0.4	+0.2	0.0	+0.2	-0.4	-0.6	-0.8	-1.0	-1.2	-1.4	-1.7

# TABLE B.

FOR FINDING THE LATITUDE OF A PLACE BY ALTITUDES OF POLARIS.

*B* = the 2d correction. This correction is always additive.

Star's Hour	STAR'S ALTITUDE										Star's Hour
	Angle.	44°	45°	46°	47°	48°	49°	50°	51°	52°	Angle.
h m	"	"	"	"	"	"	"	"	"	"	h m
0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12 0
10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	11 50
20	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	40
30	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.2	30
40	1.6	1.7	1.7	1.7	1.8	1.9	1.9	2.0	2.1	2.1	20
50	2.5	2.6	2.7	2.7	2.8	2.9	3.0	3.1	3.2	3.4	10
1 0	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.6	4.8		0
10	4.9	5.0	5.2	5.4	5.6	5.8	6.0	6.2	6.5	6.5	10 50
20	6.3	6.5	6.8	7.0	7.3	7.5	7.8	8.1	8.4	8.4	40
30	7.9	8.2	8.5	8.8	9.1	9.4	9.8	10.1	10.5	10.5	30
40	9.6	10.0	10.3	10.7	11.1	11.5	11.9	12.3	12.8	12.8	20
50	11.5	11.9	12.3	12.8	13.2	13.7	14.2	14.7	15.2	15.2	10
2 0	13.5	14.0	14.5	15.0	15.5	16.1	16.6	17.2	17.9	17.9	0
10	15.6	16.1	16.7	17.3	17.9	18.5	19.2	19.9	20.6	20.6	9 50
20	17.7	18.4	19.0	19.7	20.4	21.1	21.9	22.7	23.5	23.5	40
30	20.0	20.7	21.4	22.2	23.0	23.8	24.7	25.6	26.5	26.5	30
40	22.3	23.1	23.9	24.7	25.6	26.5	27.5	28.5	29.5	29.5	20
50	24.6	25.5	26.4	27.3	28.3	29.3	30.4	31.5	32.6	32.6	10
3 0	27.0	27.9	28.9	29.9	31.0	32.1	33.3	34.5	35.7	35.7	0
10	29.3	30.4	31.4	32.6	33.7	34.9	36.2	37.5	38.9	38.9	8 50
20	31.6	32.8	33.9	35.2	36.4	37.7	39.1	40.5	42.0	42.0	40
30	33.9	35.1	36.4	37.7	39.0	40.4	41.9	43.4	45.0	45.0	30
40	36.2	37.5	38.8	40.2	41.6	43.1	44.7	46.3	48.0	48.0	20
50	38.4	39.7	41.1	42.6	44.1	45.7	47.3	49.1	50.9	50.9	10
4 0	40.4	41.9	43.4	44.9	46.5	48.2	49.9	51.7	53.6	53.6	0
10	42.4	43.9	45.5	47.1	48.8	50.6	52.4	54.3	56.2	56.2	7 50
20	44.3	45.9	47.5	49.2	51.0	52.8	54.7	56.7	58.7	58.7	40
30	46.0	47.7	49.4	51.1	52.9	54.8	56.8	58.9	61.0	61.0	30
40	47.6	49.3	51.1	52.9	54.8	56.7	58.8	60.9	63.1	63.1	20
50	49.1	50.8	52.6	54.5	56.4	58.4	60.5	62.7	65.0	65.0	10
5 0	50.3	52.1	54.0	55.9	57.9	60.0	62.1	64.4	66.7	66.7	0
10	51.4	53.2	55.1	57.1	59.1	61.2	63.4	65.7	68.1	68.1	6 50
20	52.3	54.2	56.1	58.1	60.2	62.3	64.6	66.9	69.3	69.3	40
30	53.0	54.9	56.9	58.9	61.0	63.2	65.4	67.8	70.3	70.3	30
40	53.5	55.4	57.4	59.4	61.6	63.8	66.1	68.5	71.0	71.0	20
50	53.8	55.7	57.7	59.8	61.9	64.1	66.4	68.8	71.4	71.4	10
6 0	53.9	55.8	57.8	59.9	62.0	64.3	66.6	69.0	71.5	71.5	0

# TABLE C.

*C* = the 3d correction. Hor. Arg., the star's declination. Vert. Arg., *B* = the 2d correction.

B.	88° 39'				88° 40'						88° 41'		
	20"	30"	40"	50"	0"	10"	20"	30"	40"	50"	0"	10"	20"
30	+0.5	+0.4	+0.2	+0.1	0.0	-0.1	-0.2	-0.4	-0.5	-0.6	-0.7	-0.9	-1.0
40	0.7	0.5	0.3	0.2	0.0	0.2	0.3	0.5	0.7	0.8	1.0	1.1	1.3
50	0.8	0.6	0.4	0.2	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6
60	1.0	0.7	0.5	0.2	0.0	0.2	0.5	0.7	1.0	1.2	1.5	1.7	2.0
70	1.2	0.9	0.6	0.3	0.0	0.3	0.6	0.9	1.2	1.4	1.7	2.0	2.3
80	+1.3	+1.0	+0.7	+0.4	0.0	-0.4	-0.7	-1.0	-1.3	-1.6	-2.0	-2.3	-2.6

# TABLE B.

FOR FINDING THE LATITUDE OF A PLACE BY ALTITUDES OF POLARIS.

*B* = the 2d correction. This correction is always additive.

Star's Hour Angle.	STAR'S ALTITUDE.								Star's Hour Angle.
	53°	54°	55°	56°	57°	58°	59°	60°	
h m	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	h m
0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12 0
10	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	11 50
20	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	40
30	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.6	30
40	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	20
50	3.5	3.6	3.7	3.9	4.0	4.2	4.3	4.5	10
1 0	5.0	5.1	5.3	5.5	5.8	6.0	6.2	6.5	0
10	6.7	6.9	7.2	7.5	7.8	8.1	8.4	8.7	10 50
20	8.7	9.0	9.3	9.7	10.1	10.4	10.9	11.3	40
30	10.8	11.3	11.7	12.1	12.6	13.1	13.6	14.2	30
40	13.2	13.7	14.2	14.8	15.4	16.0	16.6	17.3	20
50	15.8	16.4	17.0	17.6	18.3	19.1	19.8	20.6	10
2 0	18.5	19.2	19.9	20.7	21.5	22.3	23.2	24.2	0
10	21.4	22.2	23.0	23.9	24.8	25.8	26.8	27.9	9 50
20	24.4	25.3	26.2	27.2	28.3	29.4	30.6	31.8	40
30	27.5	28.5	29.6	30.7	31.9	33.1	34.4	35.9	30
40	30.6	31.8	33.0	34.2	35.5	36.9	38.4	40.0	20
50	33.8	35.1	36.4	37.8	39.3	40.8	42.4	44.2	10
3 0	37.1	38.4	39.9	41.4	43.0	44.7	46.5	48.4	0
10	40.3	41.8	43.4	45.0	46.8	48.6	50.5	52.6	8 50
20	43.5	45.1	46.8	48.6	50.5	52.5	54.6	56.8	40
30	46.7	48.4	50.2	52.1	54.1	56.3	58.5	60.9	30
40	49.7	51.6	53.5	55.6	57.7	59.9	62.3	64.9	20
50	52.7	54.7	56.7	58.9	61.2	63.6	66.1	68.8	10
4 0	55.6	57.7	59.8	62.1	64.5	67.0	69.7	72.6	0
10	58.3	60.5	62.8	65.2	67.7	70.3	73.1	76.1	7 50
20	60.9	63.2	65.5	68.0	70.6	73.4	76.4	79.5	40
30	63.2	65.6	68.1	70.7	73.4	76.3	79.4	82.6	30
40	65.5	68.0	70.6	73.3	76.1	79.1	82.3	85.6	20
50	67.4	70.0	72.7	75.5	78.4	81.5	84.8	88.2	10
5 0	69.2	71.9	74.7	77.6	80.6	83.8	87.2	90.7	0
10	71.0	73.8	76.7	79.7	82.8	86.1	89.6	93.2	6 50
20	72.9	75.8	78.8	81.9	85.1	88.5	92.1	95.8	40
30	74.6	77.6	80.7	83.9	87.2	90.7	94.4	98.2	30
40	76.3	79.4	82.6	85.9	89.3	92.9	96.7	100.6	20
50	77.9	81.1	84.4	87.8	91.3	95.0	98.8	102.8	10
6 0	79.4	82.7	86.1	89.6	93.2	97.0	100.9	105.0	0

# TABLE C.

*C* = the 3d correction. Hor. Arg., the star's declination. Vert. Arg., *B* = the 2d correction.

<i>B.</i>	88° 39'				88° 40'					88° 41'			
	20"	30"	40"	50"	0"	10"	20"	30"	40"	50"	0"	10"	20"
1 0	+1.0	+0.7	+0.5	+0.2	0.0	-0.2	-0.5	-0.7	-1.0	-1.2	-1.5	-1.7	-2.0
10	1.2	0.9	0.6	0.3	0.0	0.3	0.6	0.9	1.2	1.4	1.7	2.0	2.3
20	1.3	1.0	0.7	0.3	0.0	0.3	0.7	1.0	1.3	1.7	2.0	2.3	2.6
30	1.5	1.1	0.7	0.4	0.0	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0
40	1.7	1.2	0.8	0.4	0.0	0.4	0.8	1.2	1.7	2.1	2.5	2.9	3.3
50	1.8	1.4	0.9	0.5	0.0	0.4	0.9	1.4	1.8	2.3	2.7	3.2	3.6
2 0	+2.0	+1.5	+1.0	+0.5	0.0	-0.5	-1.0	-1.5	-2.0	-2.5	-3.0	-3.5	-4.0

# TABLE D.

## FOR FINDING THE LATITUDE OF A PLACE BY ALTITUDES OF POLARIS.

$D$  = the 3d correction. ( $D$  has the same sign as  $A$  when the Dec.  $< 88^{\circ} 40'$ , the opposite sign when the Dec.  $> 88^{\circ} 40'$ .)

Vertical Argument,  $A$  = the 1st correction. Horizontal Argument, the star's declination.

$A$	DECLINATION, $88^{\circ} 40'$ .								$88^{\circ} 41'$ .						PROPORTIONAL PARTS.			
	20"	25"	30"	35"	40"	45"	50"	55"	0"	5"	10"	15"	20"	25"	1"	2"	3"	4"
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1.0	0.9	0.7	0.6	0.5	0.4	0.2	0.1	0.0	0.1	0.2	0.4	0.5	0.6	0.0	0.0	0.1	0.1
4	2.0	1.7	1.5	1.2	1.0	0.7	0.5	0.2	0.0	0.2	0.5	0.7	1.0	1.2	0.0	0.1	0.1	0.2
6	3.0	2.6	2.2	1.9	1.5	1.1	0.7	0.4	0.0	0.4	0.7	1.1	1.5	1.9	0.1	0.1	0.2	0.3
8	4.0	3.5	3.0	2.5	2.0	1.5	1.0	0.5	0.0	0.5	1.0	1.5	2.0	2.5	0.1	0.2	0.3	0.4
10	5.0	4.4	3.7	3.1	2.5	1.9	1.2	0.6	0.0	0.6	1.2	1.9	2.5	3.1	0.1	0.2	0.4	0.5
12	6.0	5.2	4.5	3.7	3.0	2.2	1.5	0.7	0.0	0.7	1.5	2.2	3.0	3.7	0.1	0.3	0.4	0.6
14	7.0	6.1	5.2	4.4	3.5	2.6	1.7	0.9	0.0	0.9	1.7	2.6	3.5	4.4	0.2	0.3	0.5	0.7
16	8.0	7.0	6.0	5.0	4.0	3.0	2.0	1.0	0.0	1.0	2.0	3.0	4.0	5.0	0.2	0.4	0.6	0.8
18	9.0	7.9	6.7	5.6	4.5	3.4	2.2	1.1	0.0	1.1	2.2	3.4	4.5	5.6	0.2	0.4	0.7	0.9
20	10.0	8.7	7.5	6.2	5.0	3.7	2.5	1.2	0.0	1.2	2.5	3.7	5.0	6.2	0.2	0.5	0.7	1.0
22	11.0	9.6	8.2	6.9	5.5	4.1	2.7	1.4	0.0	1.4	2.7	4.1	5.5	6.9	0.3	0.5	0.8	1.1
24	12.0	10.5	9.0	7.5	6.0	4.5	3.0	1.5	0.0	1.5	3.0	4.5	6.0	7.5	0.3	0.6	0.9	1.2
26	13.0	11.4	9.7	8.1	6.5	4.9	3.2	1.6	0.0	1.6	3.2	4.9	6.5	8.1	0.3	0.6	1.0	1.3
28	14.0	12.2	10.5	8.7	7.0	5.2	3.5	1.7	0.0	1.7	3.5	5.2	7.0	8.7	0.3	0.7	1.0	1.4
30	15.0	13.1	11.2	9.4	7.5	5.6	3.7	1.9	0.0	1.9	3.7	5.6	7.5	9.4	0.4	0.7	1.1	1.5
32	16.0	14.0	12.0	10.0	8.0	6.0	4.0	2.0	0.0	2.0	4.0	6.0	8.0	10.0	0.4	0.8	1.2	1.6
34	17.0	14.9	12.7	10.6	8.5	6.4	4.2	2.1	0.0	2.1	4.2	6.4	8.5	10.6	0.4	0.8	1.3	1.7
36	18.6	15.7	13.5	11.2	9.0	6.7	4.5	2.2	0.0	2.2	4.5	6.7	9.0	11.2	0.4	0.9	1.3	1.8
38	19.0	16.6	14.2	11.9	9.5	7.1	4.7	2.4	0.0	2.4	4.7	7.1	9.5	11.9	0.5	0.9	1.4	1.9
40	20.0	17.5	15.0	12.5	10.0	7.5	5.0	2.5	0.0	2.5	5.0	7.5	10.0	12.5	0.5	1.0	1.5	2.0
42	21.0	18.4	15.7	13.1	10.5	7.9	5.2	2.6	0.0	2.6	5.2	7.9	10.5	13.1	0.5	1.0	1.6	2.1
44	22.0	19.2	16.5	13.7	11.0	8.2	5.5	2.7	0.0	2.7	5.5	8.2	11.0	13.7	0.5	1.1	1.6	2.2
46	23.0	20.1	17.2	14.4	11.5	8.6	5.7	2.9	0.0	2.9	5.7	8.6	11.5	14.4	0.6	1.1	1.7	2.3
48	24.0	21.0	18.0	15.0	12.0	9.0	6.0	3.0	0.0	3.0	6.0	9.0	12.0	15.0	0.6	1.2	1.8	2.4
50	25.0	21.9	18.7	15.6	12.5	9.4	6.2	3.1	0.0	3.1	6.2	9.4	12.5	15.6	0.6	1.2	1.9	2.5
52	26.0	22.7	19.5	16.2	13.0	9.7	6.5	3.2	0.0	3.2	6.5	9.7	13.0	16.2	0.6	1.3	1.9	2.6
54	27.0	23.6	20.2	16.9	13.5	10.1	6.7	3.4	0.0	3.4	6.7	10.1	13.5	16.9	0.7	1.3	2.0	2.7
56	28.0	24.5	21.0	17.5	14.0	10.5	7.0	3.5	0.0	3.5	7.0	10.5	14.0	17.5	0.7	1.4	2.1	2.8
58	29.0	25.4	21.7	18.1	14.5	10.9	7.2	3.6	0.0	3.6	7.2	10.9	14.5	18.1	0.7	1.4	2.2	2.9
60	30.0	26.2	22.5	18.7	15.0	11.2	7.5	3.7	0.0	3.7	7.5	11.2	15.0	18.7	0.7	1.5	2.2	3.0
62	31.0	27.1	23.2	19.4	15.5	11.6	7.7	3.9	0.0	3.9	7.7	11.6	15.5	19.4	0.8	1.5	2.3	3.1
64	32.0	28.0	24.0	20.0	16.0	12.0	8.0	4.0	0.0	4.0	8.0	12.0	16.0	20.0	0.8	1.6	2.4	3.2
66	33.0	28.9	24.7	20.6	16.5	12.4	8.2	4.1	0.0	4.1	8.2	12.4	16.5	20.6	0.8	1.6	2.5	3.3
68	34.0	29.7	25.5	21.2	17.0	12.7	8.5	4.2	0.0	4.2	8.5	12.7	17.0	21.2	0.8	1.7	2.5	3.4
70	35.0	30.6	26.2	21.9	17.5	13.1	8.7	4.4	0.0	4.4	8.7	13.1	17.5	21.9	0.9	1.7	2.6	3.5
72	36.0	31.5	27.0	22.5	18.0	13.5	9.0	4.5	0.0	4.5	9.0	13.5	18.0	22.5	0.9	1.8	2.7	3.6
74	37.0	32.4	27.7	23.1	18.5	13.9	9.2	4.6	0.0	4.6	9.2	13.9	18.5	23.1	0.9	1.8	2.8	3.7
76	38.0	33.2	28.5	23.7	19.0	14.2	9.5	4.7	0.0	4.7	9.5	14.2	19.0	23.7	0.9	1.9	2.8	3.8
78	39.0	34.1	29.2	24.4	19.5	14.6	9.7	4.9	0.0	4.9	9.7	14.6	19.5	24.4	1.0	1.9	2.9	3.9
80	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	0.0	5.0	10.0	15.0	20.0	25.0	1.0	2.0	3.0	4.0
PROPORTIONAL PARTS.																		
0 20	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1				
0 40	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2				
1 0	0.5	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.2				
1 20	0.7	0.6	0.5	0.4	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.3	0.4				
1 40	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0	0.1	0.2	0.3	0.4	0.5				
2 0	1.0	0.9	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0	0.1	0.2	0.4	0.5				

NOTE.—The numbers in the columns and lines marked \* are exact.



